

# **Implementation Project for Deposit-Refund System in the Republic of Belarus**

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## Abstract

The research is done in order to analyse management of waste beverage containers in Belarus and the effectiveness of policies implemented to address it. The analysis is followed by exploring whether the introduction of deposit-refund system (DRS) would help to address packaging waste issue in Belarus and, if so, what features the DRS should possess to be effective in current context. The study design is composed of three major steps. Firstly, the description of DRS as a market-based instrument (MBI) is done, followed by the presentation of two DRSs, that may provide interesting examples for Belarus. Secondly, the analysis of the waste beverage containers situation in Belarus is done, followed by the systems analysis of the policies and measures undertaken in order to address it. The analysis is followed by the assumption that DRS could become a tool, that will alter the existing situation. Thirdly, the context for DRS is defined through the PESTLE analysis framework, and the main features of the DRS to better suit the current conditions are defined.

The analysis conducted helped to identify that various policies applied since 2002 to manage packaging waste in Belarus are not successful. Among the reasons defined one could name low level of public involvement. Thus, DRS seems to be an interesting proposal for the republic to increase the level of valuable materials extraction from household waste stream. The following features of future DRS are suggested in the research: the scope, the basis, the obliged parties, the type, deposit rate, the material and financial flows, etc.

The research could be used for ex-ante evaluation of MBIs that will be used in municipal waste management in Belarus, for ex-post evaluation of the measures undertaken in the sphere. It would be interesting for the responsible authorities and for the researches, as there is a gap in assessment of the effectiveness of the measures implemented in Belarus aiming to address packaging waste.

**Keywords:** waste management in Belarus, deposit-refund system, extended producer responsibility, recycling, secondary raw materials, beverage containers.

## **Executive Summary**

Presently, the collection and recycling rates of packaging waste are not high in Belarus, thus valuable materials are lost, though the republic imports many of the packaging components, which results in double loss when it is not recycled, but just landfilled. Moreover, including packaging in mixed municipal waste stream places a burden of associated costs on municipalities: for storage, transporting, separating if possible, or just landfilling. Besides, packaging has the environmental impact associated with its primary production due to energy consumption, air emissions, etc., with its landfilling due to the long-time of its decomposition and with landscape impacts due to the problem of littering. Thus, the research conducted had the aim to show present situation with waste beverage containers in Belarus, to describe the measures introduced to address this specific waste stream and analyse the results of the measures. Secondly, the analysis was followed by the question whether DRS could address the issue of waste beverage containers, and if it could, what main features should DRS carry in order to present good solution for the prevailing Belarusian conditions.

The aim of the research was achieved by collecting and processing information for the following research questions:

RQ1: What is the current situation with waste plastic, glass and metal beverage containers in the Republic of Belarus?

RQ2: What measures have been used in order to address the management of waste beverage containers in the Republic of Belarus and what was the effectiveness?

RQ3: Could the implementation of DRS address the effectiveness of the system?

RQ4: How could the DRS be designed in order to be effective, transparent, fair and open in regards with the prevailing Belarusian conditions and the possibility of adapting?

The study design was composed of three major steps. Firstly, the description of DRS as a market-based instrument (MBI) was done, followed by the presentation of two DRSs, that may provide interesting examples for Belarus. Secondly, the analysis of the waste beverage containers situation in Belarus was done, in parallel with the systems analysis of the policies and measures undertaken in order to address it. The analysis was followed by the assumption that DRS could become a tool, that will alter the existing situation. Thirdly, the context for DRS was defined through the PESTLE analysis framework, and the main features of the DRS to better suit the current conditions were defined.

The analysis conducted helped to identify that various policies applied since 2002 to manage packaging waste in Belarus are not successful. Among the reasons defined one could name the following: inconsistent and unsystematic approach to the challenge, shared (between different authorities) responsibilities within waste management, the attempts to solve the challenges “at the end-of-pipe”, namely, trying to work with mixed waste stream at the landfills, the attempts to increase level of secondary raw materials extraction through stimulating waste management companies, but not people - real “producers” of waste, per se, and so, low level of citizens’ involvement, etc.

Thus, a need to implement the approach that could involve public in the system by causing interest in participating in it was realised. Down-stream approach, aiming to stimulate public participation in the system, could address both the issue of the quality and purity of materials

collected, and the need of maximising the extraction rate. It would also be an opportunity to prevent economic loss associated with landfilling of valuable materials, to decrease costs of municipal waste management, to prevent littering. So, DRS seemed to be an interesting proposal for the republic.

When identifying the challenges, that could be addressed by the DRS implementation, and the issues that can't be addressed by the DRS, the following main benefits of the DRS introduction were defined: raise of the level of secondary raw materials extraction, prevented (to a certain extend) economic loss and environmental impacts, increase of public involvement in the issue, improvement of the measures implemented in order to address packaging waste, valuable waste can increase economic turnover, stimulation of the re-using practices, elimination of frauds in the EPR scheme, etc.

The analysis of challenges and opportunities that can be addressed and used by the future DRS, was followed by the identification of the context for policy implementation. In regards to the context, the following features of the future DRS were suggested: the type of the DRS is recommended to be voluntary and based on the EPR scheme in such a way that those producers and importers, who won't join the DRS, will be paying a fee according the existing EPR scheme. It is suggested that the DRS uses partly the existing scheme for waste collection, and partly starts its own through the obliged retailers. The deposit fee is suggested to be the same for all the beverage containers to lower the administrative burden. It is suggested to accompany the deposits for one-way containers with handling fee, so as to stimulate re-using of containers, especially, glass bottles. It is suggested that recyclers would be partly subsidised through the DRS. It was recommended to have the collection and recycling rates set legislatively, so as to apply the obligation to the administrating authority.

The present research could be used for ex-ante evaluation of MBIs that will be used in municipal waste management in Belarus, for ex-post evaluation of the measures undertaken in the sphere. It would be interesting for the responsible authorities and for the researches, as there is a gap in assessment of the effectiveness of the measures implemented in Belarus aiming to address packaging waste.

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## **Abbreviations**

DRS	Deposit-refund system
EPR	Extended producer responsibility
EU	European Union
MBI	Market-based instrument
RVM	Reverse-vending machine



# 1 Introduction

## 1.1 Background

People have been collecting and using valuable waste fractions since long ago. Currently, the management of so called secondary raw materials – valuable waste materials that could potentially be recycled into new products – has two main aims:

- environmental, addressing burden associated with waste (lands needed for landfills, ground water pollution, air pollution, landscape deterioration, etc.) and with natural resource use (resource scarcity, resource depletion, impacts associated with its extraction, etc.)
- economic, addressing potentials to avoid lost profit, associated with resources that are not adding to economic turnover but are disposed of.

Many policies have been introduced in order to intervene in the ordinary end-of-pipe waste management approach, with some of these policies designed to address specific, well-defined product groups, for example, beverage containers, being the focus of this research. Currently, containers made of glass, plastic and metal have become a product group where there is a strong interest to address the empty containers. The following reasons made this group a specifically addressed one:

- plastic, metal and glass waste could if correctly treated be recycled into products of essentially the same quality as the primary products
- when being recycled, they significantly decrease the impact on the environment if to compare with the production from virgin raw materials (for example, the production of an aluminium can from waste consumes only 5% of the energy needed for the production of the same can made from primary material (Palpa, 2016)
- plastic, metal and glass waste constitute a considerable part of the municipal waste stream, thus demanding efforts and money to manage them
- they are known as one of the most essential sources of littering
- when not addressed accordingly, plastic, metal and glass waste present economic loss, as valuable materials is just disposed of instead of being recycled.

Thus, during the last century, this product group has been given special attention in many countries. Different market-based instruments are applied to manage it, namely, deposit-refund systems, extended producer responsibility schemes, environmental taxes and etc.

DRS is often seen as an alternative to Pigovian tax when addressing pollution control (Bohm, 1981; Fullerton and Wolverton, 2000), though experts highlight the advantage of DRS over the tax in the following core issues: firstly, DRS helps to eliminate illegal dumping or littering that may occur as the result of tax implementation and secondly, instead of trying to avoid tax payments, in case of DRS implementation the efforts of producers are focused on increasing the rates of return (Walls, 2011).

EPR schemes have been applied to cover packaging waste since early "90s. Being a measure of improving product design and shifting the costs associated with waste management from municipalities to product manufacturers, EPR proved to be quite successful in addressing different waste streams, including packaging waste (Cahill et al., 2010).

Still, quite a few countries all over the world have chosen to implement DRS, as a down-stream approach, aimed to involve people in waste management and address beverage containers, a visible part of packaging.

During the last decades, Belarus has also implemented a variety of different policies addressing the product group of beverage containers. In the Soviet time, glass bottles – most widely used beverage containers at that time – were covered by DRS and it used to be really effective. After 1991, when Belarus became an independent country, though many efforts were spent and a variety of policies was applied to manage waste beverage containers, the results are not impressive at the moment.

There is a knowledge gap in analysis of the current waste packaging management situation in regards with measures that have been implemented in order to address it. Thus, the research would be focused on the analysis of instruments introduced to manage packaging waste in the Republic of Belarus, and on the effectiveness of the results achieved. The analysis would be followed by questioning whether introduction of DRS, that is currently being discussed at the state level in Belarus, would influence the situation, and if it would – how the DRS should look like in order to better suit the context of Belarusian prevailing conditions.

## 1.2 Problem definition, research aim

The research is done in order to analyse the management of waste beverage containers in Belarus and the effectiveness of the policies implemented to address it during the last decades and, correspondingly, the results achieved. The analysis would be followed by exploring whether the introduction of DRS would help to address packaging waste issue in Belarus and, if so, what features the DRS should possess in order to be effective in current context.

It is worthwhile to do the research because presently, the collection and recycling rates of packaging are not high, thus valuable materials are lost, though Belarus imports many of the packaging components, which results in double loss when packaging is not recycled. Moreover, including packaging in mixed municipal waste stream places a burden of associated costs on municipalities: for storage, for transporting, for separating if possible or just landfilling. Besides, packaging has the environmental impact associated with its primary production due to energy consumption, air emissions, etc., with its landfilling due to the long-time of its decomposition and with landscape impacts due to the problem of littering.

The aim of the research is to show the present situation with waste beverage containers in Belarus, to describe the measures introduced to address this specific waste stream and analyse the results of the measures. Secondly, the analysis will be followed by the question whether DRS could address the issue, and if it could, what main features should such a DRS carry, in order to present good solution for the prevailing Belarusian conditions.

## 1.3 Research questions

The aim of the research can be achieved by collecting and processing information for the following research questions:

RQ1: What is the current situation with waste plastic, glass and metal beverage containers in the Republic of Belarus?

RQ2: What measures have been used in order to address the management of waste beverage containers in the Republic of Belarus and what was the effectiveness?

RQ3: Could the implementation of DRS address the effectiveness of the system?

RQ4: How could the DRS be designed in order to be effective, transparent, fair and open in regards with the prevailing Belarusian conditions and the possibility of adapting?

## **1.4 Scope**

The research is focused to address waste beverage containers, made of plastic, glass and metal, as a product group that may be controlled through specific policies. Paper beverage containers are excluded from the scope, as they are mostly Tetra Paks, and nowadays Belarus does not have the facility to recycle this type of waste. Additionally, Tetra Paks are mostly used for dairy products, and it is a specially addressed group of products in Belarus, prices for it are regulated by the government, as raising the prices may affect poor stratum of population.

One single market-based instrument (MBI) – DRS – is chosen to be assessed when questioning whether the current situation could be altered with the introduction of new policy. The choice of the instrument is dictated by the current strong political will to implement DRS in the republic, thus, it seems to be reasonable to question whether it could address the situation. No more alternative policies are evaluated that depends also on the time constraints.

Geographically the research has two ranges of coverage:

- the situation in the Republic of Belarus – to be analysed in order to find out the effectiveness of the current waste beverage containers management and the results of the measures implemented.
- several European DRSs and strategies for their implementation – to be analysed in order to provide a basis for understanding the focus of the policy, the results and specific features of DRSs. The choice of the countries is done after brief scanning of the alternatives, based on the assumption that the example chosen could present useful lectures for the republic.

## **1.5 Audience**

The research may present interest for the responsible authorities in Belarus – the Ministry of Environment (full name – the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus), the Ministry of Communal Services (full name – the Ministry of Communal Services and Housing of the Republic of Belarus) and the Operator of Secondary Raw Materials.

Moreover, researchers and academia may find it useful, as the research aims to be based on data that is rather poorly covered by other researchers in the field, namely analysis of the measures implemented in order to manage waste beverage containers in Belarus.

## **1.6 Disposition**

Chapter 1 of the report aims to present background to the problem under research, with research questions and research objective stated to ensure clarity of the analysis and proposed schemes and strategies to follow.

Chapter 2 follows with the description of methodology chosen to conduct the research, as well as justification of the choice.

Chapter 3 comes with the presentation of DRS as a tool, followed by the description of functioning of DRS in two European countries, their unique features, effectiveness, organisational schemes, materials and financial flows, etc.

Chapter 4 is designed to present the current situation in waste beverage container management and the policies implemented during the last decade in order to foster the effectiveness of the management system in Belarus. It is summarised by providing reasonable explanation of the insufficient packaging waste management situation and followed by questioning whether DRS could alter the present state of affairs.

Chapter 5 outlines challenges and opportunities for DRS, in order to describe the context for policy implementation. It is also designed to present possible DRS scheme, that could suit the prevailing Belarusian conditions, and strategy for its implementation respectively.

The research is finalised with conclusions and recommendations for further research.

## **2 Methodology**

### **2.1 Research design**

To address the aim of the research, the methodology is composed of three major steps and follows a bottom-up approach. The chosen steps are elaborated below.

The first step, aiming to present DRS as a market-based instrument (MBI), and to describe the way it works, is done in order to create basis for understanding the main principles of the instrument and the issues it may address within municipal waste management. The choice of the DRSs to be described broader was done after brief scanning of the alternatives, and was based on the assumption that the examples chosen could present useful lectures for the republic. The following criteria were the most important ones when choosing the examples: the most effective system, known for high results achieved, and the latest introduced. The chosen examples are described using the same framework. Thus, the following information is provided within the systems' descriptions: the types of the system, the legislative basis, the scopes, the organisational schemes, the material and financial flows, etc.

The analysis of waste beverage containers management in Belarus is the second step of the research. The analysis shows measures undertaken in order to address the issue of packaging, and the result achieved. It is followed by possible explanations of poor results and by the assumption that DRS could improve the situation.

In order to find out the context for DRS implementation, and identify challenges that can be addressed by DRS implementation, the PESTLE analysis, a tool that is widely used for strategic planning at different levels, was used (Recklies, 2016). This tool helps to identify political, economic, social, technological, legal and ecological factors on macroeconomic level that will influence the introduction of policy. In order to be able to properly design DRS, the identified factors of each category were subdivided in three types: the ones that could be addressed by the DRS, the ones that can't be altered with its help and the opportunities for DRS to be based on. Thus, the third step of the research included process of designing specific features of the DRS and the strategy for its implementation. The design was created in accordance with the context for policy implementation defined with the PESTLE analysis.

### **2.2 Methods for data collection**

The following methods were used to collect the data: literature review, interviews with the representatives of responsible authorities and experts in the field, primary source information.

For the first part – the presentation of European DRSs – the data was collected through:

- peer-reviewed articles on DRSs in different countries
- data and statistics presented on the homepages of the coordinating responsible organisations.
- grey literature, having DRS as an issue to analyse.

For the second part – the analysis of Belarusian prevailing conditions – the following sources were used as the ways of gathering information:

- data and statistics presented on the homepages of the relevant authorities – the Ministry of Environment, the Operator of Secondary Raw Materials (environmental bulletins, reports on waste collection and recycling rates)
- relevant legislative acts
- grey literature on waste management situation in Belarus (newspaper articles, the information from seminars and conferences on the topic, articles in the internet)
- interviews with experts and representatives of responsible authorities
- data from relevant reports of waste management projects.

The literature was found and accessed based on past experience in the field of waste management in Belarus, experts were chosen as people known for their long time input in solving environmental issues in the republic. Thus, one of them is the designer of the Law on Waste Management of the Republic of Belarus, and many sub-legal acts in the field of waste management. He is also providing consultancy for many waste management projects, the same as the second interviewee, famous for being the consultant and the coordinator of various international waste management projects. The representative of the responsible authority interviewed is the director of the Operator of Secondary Raw Materials – the organisation in charge of valuable waste resources management.

The conducted interviews were designed as semi-structured. The list of interviews, and the questions stated can be found in Annex 1.

For designing DRS that could correspond to the context of its implementation, peer-reviewed articles on DRS implementation in European countries, and Communication of European Commission 2009/C 107/01 Beverage Packaging, Deposit Systems and Free Movement of Goods were used as starting points.

## 2.3 Methods for data analysis

In order to understand the effectiveness of the measures introduced to address waste beverage containers in the Republic of Belarus, systems analysis of the management paths and the results achieved was conducted. There wasn't done a policy analysis in the research, as many various policies have been introduced in Belarus up till nowadays, and not the assessment of each of them, but the assessment of the situation in general was the focus of the present research. Thus, systems analysis of the effectiveness of different tools mix was chosen to reach the aim of the research.

The context for DRS implementation was defined through the PESTLE analysis. The PESTLE analysis was additionally supplemented with subdivision of factors analysed: opportunities for future DRS, the factors that could be changed by the DRS and those that can't be addressed by the MBI.

### **3 Deposit-refund systems**

According to the statistics of 2011, collected by the United Nations Statistics Division, the amount of municipal waste, generated in the world per year, accounts for more than 900 000 000 tonnes with average recycling rate approximately 12%, while the level of incineration comprises 14%, of composting – approximately 5%, and the rest (more than 60%) goes to landfills (United Nations Statistics Division, 2016). Taking into account that only 78 countries are included in the report, one can assume that municipal waste situation is even more dramatic. This incredible amount does not show tendency to decrease or even to remain at the same level and continues to rise.

Apart from important territories that are set aside for landfills, there are a number of other concerns that forced humankind to address the issue of waste. Among those, public health concern was the starting point, followed by the rise in aesthetic concern as historical evidence shows, which in its turn was supported by economic drivers in the era of industrial revolution, followed by environmental and resource scarcity as the most recent driving forces of the last century (Marshall et al., 2013).

In the recent decades, waste management approach has been characterised by shifting to waste hierarchy-based approach as opposed to the end-of-pipe approach that had been used for many centuries before. The same paradigm is also applicable to municipal waste management. This shift resulted in the introduction of various waste management policies aiming to optimise re-using, recycling and circulating of resources in economic turnover. In many countries, these activities are prioritised over energy recovery activities and landfilling of waste. To enable re-use, recycling and other waste addressing activities, waste should be sorted, preferably close to the source of origin (Ordoñez et al., 2015). Waste sorting helps to ensure high quality of materials extracted and create sustainable waste management approach.

Waste management is often addressed with the help of market-based instruments. MBIs are regulatory tools aiming to alter behaviour patterns through prioritization of market signals (such as price, subsidies, refund, etc.) over the command regulations (Hockenstein et al., 1997).

One of MBIs, widely used within waste management, is deposit-refund system, a system actually comprised of the mix of two mechanisms:

- **consumer payment (deposit)** for product that can potentially impose high environmental burden, if disposed of improperly
- and **refund**, which can be reimbursed to consumer when the product is returned (Numata, 2016).

As far as contexts for DRS implementation and functioning are unique, DRS needs to be properly designed for every situation, in order to be efficient and able to meet the targets set.

#### **3.1 DRS as a waste management policy tool**

DRS is one of the market-based instruments aiming to address the issue of careful waste management by creating an incentive for customers to take an active part in waste collection. The Glossary of Environment Statistics of OECD provides the following definition of the instrument: “A deposit-refund system is the surcharge on the price of potentially polluting products. When pollution is avoided by returning the products or their residuals, a refund of the surcharge is granted” (Glossary, 2016).

Thus, most commonly, DRS involves retailers by setting obligations to collect charges, called deposits, for certain products when a customer buys the products, and to refund the charges when the customer brings used purchases back. Various products can be covered by DRSs, but it is mainly settled to ensure high collection rates for valuable beverage containers, such as aluminium and steel cans, plastic and glass bottles. DRS may also be named differently when applied to such products, for example, terms Container Deposit Scheme, Beverage Containers System and Bottle Bills are used in some countries, when DRS is designed to cover only beverage containers.

By its nature DRSs may be of mandatory or voluntary type. Back to the beginning of DRS implementation, they were mostly of voluntary type, but since the production costs from virgin materials began to decrease as compared to the costs associated with collection and recycling, the voluntary systems have been replaced by mandatory. Mandatory systems are especially popular for one-way containers, and the implementation of mandatory systems shows higher collection rates achieved as compared to systems based on alternatives (Xevgenos et al., 2015).

Many experts see DRS as optimal implementation of fees in comparison with taxes, subsidies applied, bans, etc. (Numata, 2009).

DRS is recognised as a combination of economic and physical responsibility of producers for their products (White, 2002), meaning that producers have to take the burden of payments, though partly divided with customers, and sometimes producers are also free to create their own system of collection and reprocessing of the waste, thus carrying the physical responsibility for the waste that occurs in the result of their products being used.

In general, DRSs aim to meet the following goals:

- high quality of the materials collected
- high collecting rates
- shifting the burden of sorting out recyclable materials to the end-users - consumers
- raising end-users' involvement in the process, raising their environmental awareness
- collecting materials that could be recycled easily
- shifting the costs associated with waste management activities from municipalities to producers (Fitzsimons et al, 2010).
- serving as a tool for product-oriented initiatives, such as EPR, etc.

The schemes for implementation of DRS may vary in the range of focus products, established rules, stakeholders, deposit rates, involved actors, flexibility, effectiveness and many other characteristics, but they are common in their goal – ensuring high reuse and recycling rates of waste through achieving high collection levels (EPA, 2001). Effectiveness of the system also depends on many other factors, such as national waste management policy, high transboundary movement of the products, deposit rate, flexibility of the system, public awareness and involvement, etc. All these factors need to be taken into account in order to maximise the utility of the system implemented.

The following stakeholders are directly involved in the process of implementing, monitoring and managing the system: customers as end-users, retailers, public, importers and producers, organisations responsible for managing DRS. Not all of them are addressed by DRSs to the same extent thus some stakeholders may oppose the introduction of the system due to the negative impact they may experience. For example, with the introduction of DRS retailers may face the following three issues: lower sales rates due to the rise of prices, huge investments in the implementation phase and handling costs involved when DRS starts to function (Numata, 2009). So different ways to address these negative impacts have been worked out, like implementation of handling fees, loans for RVMs, etc. All these measures applied in order to counterbalance externalities of the system create unique character of certain DRS and define its costs and effectiveness. And though implementation costs may vary considerably, there is no evidence that DRS demands more funds involved than ordinary separate waste collection (Xevgenos et al., 2015).

It should also be mentioned that not every country chooses to have DRS in place, as separate collection of valuable raw materials could be addressed in different ways. But in many cases high recycling rates of valuable secondary raw materials (above 80%) are associated with DRS implementation (Xevgenos et al., 2015).

The general information on DRSs implemented in Europe is represented below. The author has chosen to analyse DRSs launched in the European countries, as there are some common rules and requirements worked out in Europe in order to overcome contradictions arising when different systems need to correlate and provide equal, non-discriminating opportunities for all the stakeholders. Moreover, European context itself can provide some analogy for Belarusian conditions, in the sense of open borders, common past experience during Soviet-time period, a wide range of schemes and strategies functioning simultaneously.

### **3.2 DRSs in the European context**

Packaging waste, more than 20% of which constitutes beverage containers packaging, is a specifically managed waste group in Europe. The requirements to ensure certain rates of its recycling are settled by European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste. Though European countries are free to decide upon the tools to reach the targets set, several EU-members have chosen to implement DRSs to address beverage containers packaging as part of their waste management schemes.

There are no common rules defining the design of DRSs within Europe, thus a variety of systems are presented there nowadays, providing opportunities to compare the effectiveness, fairness and transparency. Nevertheless, in 2009 European Commission had to address the variety of DRSs and worked out the Communication 2009/C 107/01 Beverage Packaging, Deposit Systems and Free Movement of Goods. The document identifies some thresholds for DRSs that need to be addressed carefully in order to minimise some externalities that may occur when environmental and economic interests meet.

Historically quite a few European countries have been using DRSs on a voluntary basis. Voluntary DRSs can still be found in regards to refillable containers management. They are mostly used by domestic producers within internal market, as opposed to external producers – the long way to return refillables makes it economically not reasonable for them to participate in re-using schemes.

Currently, one-way containers are quite often covered by mandatory DRSs. Mandatory DRSs are implemented in Sweden, Germany, Denmark, Estonia, etc. Nevertheless, Finnish system

being of voluntary type by its nature, is supposed to be one of the most efficient when talking about the collection rates achieved. Among mandatory systems, Lithuanian is the latest introduced.

Thus, for the purpose of the research, the DRSs in Finland and in Lithuania were chosen and presented in the next chapters. The choice was made based on the following reasons:

- The Finnish system is supposed to be one of the most efficient DRSs, if we take effectiveness as high return rates obtained.
- Lithuanian DRS is of interest as it is the latest system implemented in Europe in the beginning of this year, in February 2016, so it is a very vivid demonstration of the implementation strategy that could be assessed just right nowadays. Moreover, prior to DSR launching, Lithuania had used another system — a fee, that was paid by producers and importers obliged under EPR scheme, and the system proved inefficient – just as it is in the Republic of Belarus, though the preliminary results of DRS implementation show high effectiveness of the measures undertaken recently.

### 3.3 DRS in Finland

Deposit-refund system in Finland is famous for its extremely high return rates: in 2015 the return rate for aluminium cans was at the level of 95%, for plastic bottles – 92%, for recyclable glass bottles – 89%, and 98% return rate was registered for the refillable glass bottles (Palpa, 2016). In general, it is estimated, that Finnish customers return nearly 1.7 billion beverage containers every year. According to PALPA – the company responsible for DRS for one-way containers, recycling of beverage containers produces nearly 17,000 tonnes of aluminium, 13,000 tonnes of PET and 50,000 tonnes of recyclable glass annually (Helsinki Times, 2016).

As the system dates back to the beginning of the 20th century, it has undergone many changes and still stays flexible to adjust to modern needs and circumstances. More or less, the way it functions now dates back to the '90s of the last century. Nowadays, Finnish deposit-refund system looks as follows.

*The legislative basis.* It is based on two main legislative acts: Waste Law 17.6.2011/646 and Ordinance on Deposit-refund Systems for beverage containers 27.6.2013/526.

*The type.* Joining the DRS itself is voluntary for the producers and importers of beverages, though the majority of companies in practice choose to join the system. The reason for that is high beverage packaging tax (EUR 0.51 per litre) taken in the form of excise duty, that each producer or importer has to pay under the Act on Excise Duty on Certain Beverage containers 1037/2004, and the exemption from the tax is provided to the companies taking part in one of the DRSs (Palpa, 2016). The exemption is also provided to small producers with capacity less than 50 000 litres per year. Besides, some producers or importers may choose to have their own system, as for example, Lidl, but it is not a common practice. The participation of retailers in the system is mandatory according to Waste Law: every retailer selling beverages must receive empty beverage containers included in the DRSs in a quantity as regards the quantity of drinks for sale (section 71, chapter 7 Waste Law 17.6.2011/646).

*The scope.* DRSs in Finland cover containers from the following beverages: alcohol, soft drinks, juices, water of different types, i.e. every type of beverage, except dairy product.

*The organisational scheme.* Actually, there are two main DRSs in Finland nowadays: the first one managing one-way containers, and the second one covering the refillables, though companies are free to create their own system, as it has already been mentioned.

The biggest Finnish company, responsible for the management of DRS for one-way containers is Suomen Palautuspakkaus Oy (Palpa). It is partly owned by retailers, partly by beverage manufacturers, though it is under the control of the Ministry of Environment of Finland. Palpa is in charge of administrating the process of collection, transportation and recycling of the following beverage containers covered by the system: PET-bottles, aluminium cans and recyclable glass bottles. Palpa also works out different instructions for return and sorting and provides material for awareness raising campaigns and for teaching.

Another organisation, Ekopullo Ry, is nowadays administrating the system of refillable bottles of two types: refillable PET bottles and refillable glass bottles. It is also in charge of supply of empty beverage bottles.

The Ministry of Environment of Finland audits efficiency of both DRSs on a yearly basis (Ekopullo Ry). According to the Act on Excise Duty on Beverage containers, the Operating company has to fulfil the targets set by the government within 3 years after its formation. The following targets are set since 2013: 90% by weight of the recyclable packaging being collected and recycled, and 90% by weight of re-usable beverage packaging being collected and re-used (abstract 3 of the Act on Excise Duty on Beverage containers).

*Material and financial flows.* Two ways of collecting beverage containers are used: via reverse-vending machines and manually. The material and financial flows are rather evident:

- the system is financed by producers or importers of beverages. First of all, they pay a so-called membership fee for being registered in the system. Then the company joining the system should register each specific product and get a unique barcode in order for it to be easily recognised. For updating the system with new barcodes, each registration is done with the registration fee applied. Each unit of marketed product is supplemented with specific deposit and recycling fee. The rates of the fees are different depending on material type and size of beverage containers and range from 0.1 to 0.4 euro per unit. The money collected goes to one of the operating companies – Palpa or Ekopullo Ry. Producers or importers of beverages receive deposit fee back from retailers when customers buy products. Customers get reimbursement when they return empty containers to return points. Return points get their money from the operating companies. They receive so-called handling fees (for sorting, storage, cleaning of the return points, etc.) and deposit fees paid back to the customers. Transportation, logistics and other management costs, as well as partly recycling itself, are covered from the recycling fee, paid by importers and producers of beverages (Palpa, 2016). Recyclers also get money from selling recycled materials. The scheme of financial flows for one-way beverage containers is represented below. The scheme for refillable bottles would be similar, except for the following: companies using refillable bottles do not pay recycling fee – only the deposit, that comes back when the product is bought, and all handling and transport costs are covered from the membership fee.

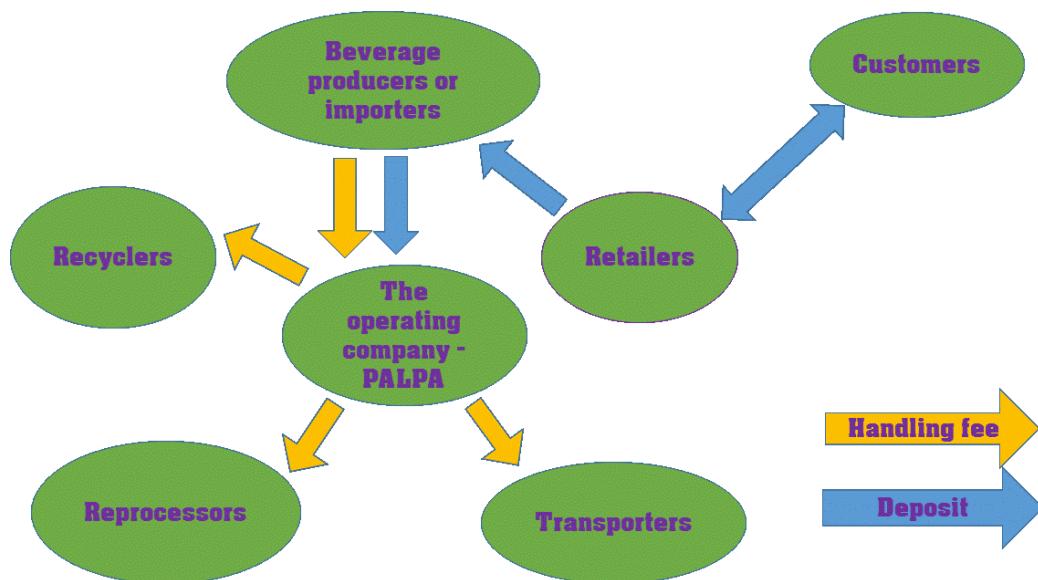


Figure 1 Financial flow within Finnish DRS for one-way beverage containers.

Source: The scheme was made by the author, based on the information from Palpa homepage, 2016.

- material flow within DRS for one-way containers looks as follows: packaging comes to retailers from manufacturers and is sold to customers together with products. Customers return empty beverage containers to return points. After that material goes to processing plants, to be counted if needed (when it comes from manual return points) and baled (aluminium cans and PET bottles), and is delivered to reprocessing/recycling facilities. The scheme of material flow is represented below. As for refillable glass bottles – brown beer bottles, it is estimated that they may circulate up to 33 times, PET bottles – up to 18 times (Ekopullo Ry, 2016). In order to manage logistics, empty refillable glass bottles are delivered by the same transport, that had delivered beverages.

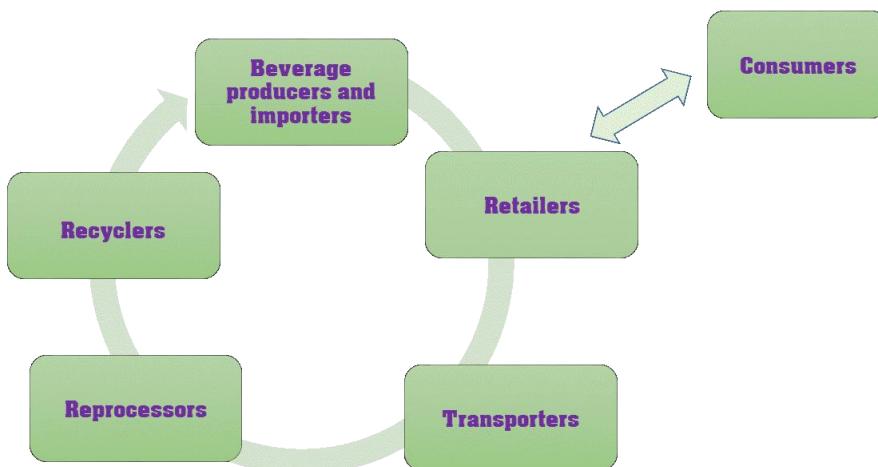


Figure 2 Material flow within Finnish DRS for one-way beverage containers.

Source: The scheme was made by the author, based on the information from Palpa homepage, 2016.

Finnish system is supposed to be efficient due to the strong cooperation of all the stakeholders: operating companies, retailers, transporters, importers and producers, and the flexibility of the system itself. Definitely, citizens' participation is of extreme importance for the system in general. Moreover, the latest waste management reform, that took place in Finland several years

ago, slightly altered the situation with DRSs functioning in Finland by uniting them in two big systems: the first one – working with one-way containers, and the second one – working with refillable bottles.

Thus, Finnish system, though being voluntary for obliged producers and importers, is recognised to be one of the most efficient. The main difference from a variety of other DRSs is the flexibility provided for producers or importers in joining the system, though it is still designed in such a way as to force following the environmentally sound system. At the same time the flexibility does not mean that some producers are just excluded from payments covering the collection and recycling of waste.

### 3.4 DRS in Lithuania

*The legislative basis.* In regards to the requirements of the Directive 94/62/EC, the Law of the Republic of Lithuania № IX – 517 On the Management of Packaging and Packaging Waste was adopted in 2001 in Lithuania. The Law introduced EPR for importers and producers of the packaging of different types. According to the scheme, they were obliged to meet certain rates of collection, re-use and recycling through tradable recycling certificates. With the amendments adopted to the Law № IX – 517 in 2012, the system was abolished and replaced by a new one. The newly introduced system provided two options for producers and importers:

- either to register themselves as a member of a collective management scheme and finance municipalities, who are generally in charge of waste management including management of packaging waste,
- or to contract waste management companies themselves and thus try to fulfil the targets set.

The municipalities were given the right to either handle municipal waste themselves or to contract waste management companies for the service. The money for financing municipalities' work, collected from obliged entities, was divided according to the market shares that each producer held in a certain municipality. If an obliged entity (producer or importer) failed to meet the defined targets, it had to pay a special pollution tax that was chosen to be weight-related (Seimas of the Republic of Lithuania, 2016).

*The type.* A recent amendment to the Law has launched a mandatory DRS for one-way containers. Prior to that, mandatory DRS for refillable glass bottles had been functioning in Lithuania and had been rather efficient – with the return rate of 85-90%.

DRS for one-way beverage containers began to function in February 2016. Prior to the system's implementation, the rates for plastic packaging collection were at the level of 17%, and for metal – 8.5% (Deposit System Administrator, 2016).

Producers and importers of products in plastic, glass and metal packaging are obliged to take part in the system, with the exemptions applied in regards to those who produce/import less than 0.5 tonnes of packaging per year. Those entities have to pay a special pollution tax to municipalities for taking care of their waste.

Retailers of one-way beverage containers are obliged to collect empty containers, except those retailers who have sales area less than 300 square metres (though the exception is not applied to the shops at country-sides), gas stations, public catering places like bars and restaurants, kiosks and department stores. The latest are free to participate in the system voluntarily.

The targets. It was assumed that approximately 55% of all one-way beverage containers will be processed by the system during the first year of its launching, which accounts for more than 300 million items collected and recycled. Yet, as of August 2016 (after 7 months of system being in place), the results are much higher than expected: the calculator for the packaging collected shows more than 200 million of items already. In the future, the levels achieved are expected to be even higher (Deposit System Administrator, 2016).

The scope. The scope of the system includes some alcohol (like beer and alcohol cocktails) and non-alcohol beverage containers (except those used for dairy products), made of glass, metal and plastic. Exported products and those provided for sale in different means of transport being under the Lithuanian jurisdiction and serving international routes, are excluded from the system's scope, as well as packaging that exceeds the volume of 3 l or that is less than 100 ml (the Law of the Republic of Lithuania № IX – 517 On the Management of Packaging and Packaging Waste). Containers filled with some types of fruit-wines and strong alcohol are not covered by the system in order to avoid complexity for importers and producers (Deposit System Administrator, 2016). The deposit is the same for all types of containers, participating in the system, and in 2016 it is set at 0.1 euro. The level of the deposit fee is reconsidered each year by the Ministry of Environment of Lithuania (Deposit System Administrator, 2016).

The organisational scheme. Public institution Deposit System Administrator (Administrator) is the authority in charge of managing DRS for one-way containers. It is a non-profit organisation, responsible for the beverage containers management through the whole circle, starting from collection and until recycling is done. The reports on the amounts collected and recycled are expected to come annually and be the criteria of the system efficiency. Recyclers of the packaging have been chosen by tender procedure. RVMs used for collecting are provided by the Administrator depending on the amount of packaging collected, the size of the shop, etc. The obligation to provide appropriate means for waste collection is settled legislatively. The maintenance and repairing of RVMs are also the obligation of the Administrator. No obligations to reach certain points of waste collection and recycling are applied to the Administrator directly, but at the same time producers and importers are obliged to ensure certain levels of packaging collected, thus Administrator, founded by the associations of producers, carries the burden of fulfilling their tasks. Penalties are applied to producers and importers in case of failure to reach the targets set, in the form of pollution fee for the amount of packaging not processed under the system.

There are two ways of collecting one-way empty beverage containers: through reverse-vending machines and manually. RVMs, though introduced just recently, are programmed so as to except all the types of beverage packaging, covered by DRSs, including refillable packaging. The obliged retailers collect all the beverage containers returned to them by customers, but the reimbursement is provided only in case of returning the packaging covered by the system. Nowadays, with the amendments to the Law № IX – 517, any retailer, taking part in the system, has to accept bottles of all types regardless of the types of packaging in its assortment, though previously the system for refillables obliged retailers to collect only the packaging sold in the shop, and that created difficulties in logistics for customers.

DRS, covering glass refillable bottles, is functioning according to the following rules: the same deposit fee is applied to all bottles within the system. The main scope of this system is beer and kvass bottles. Retailers, except those with trading area less than 90 square meters, are obliged to accept all the beverage containers covered by the system. Catering places, gas stations and kiosks are free to choose whether they would like to join the system. In addition to the retailers obliged to collect glass bottles, there can be found a separate system of collecting points for glass waste, called Eco Tashkas. People can return empty containers that are covered by the DRS for

refillables, as well as other empty glass containers to the procuring points (Lithuania in Russian, 2016).

The implementation strategy. The experience of Germany, Sweden, Estonia and Denmark has been laid down in the basis of Lithuanian DRS.

The implementation strategy of DRS for one-way containers enabled obliged producers and importers to get ready for participation in the system: three months were set as a transitional period to sell all the remaining products without labelling required by the system, to contract the Administrator, to label newly produced or imported products covered by the system and so on.

It is assumed that DRS implementation will create new jobs, approximately 1000 workplaces. Besides, the recycling market is expected to expand, as it will be supported by the Administrator.

A wide informational campaign had been conducted in Lithuania prior to the implementation of the new system.

In order to make intermediate assessment of the DRS efficiency, a public poll was conducted. The company Vilmorus, who was in charge of the poll, made the following conclusions: the absolute majority of people know about the newly introduced DRS and 78.1% of Lithuanian citizens take the system quite positively (Baltnews, 2016).

Thus, Lithuanian DRS provides a perfect opportunity to observe the process of implementation just at the moment. Moreover, it is a valuable experience showing several attempts undertaken in order to address the issue of packaging waste, framing new norms on the previously existing basis.

### 3.5 Main findings

DRSs as a waste management tool have a long history and have proved to be one of the efficient ways of addressing the issue of various types of waste, and packaging especially. Countries having DRSs in place, can be found worldwide. There are many pros and cons of DRSs, but it has proved to be a tool that helps to achieve high rates of packaging recycling obtained. There is no single scheme for DRS implementation; each country is free to choose unique system features depending on the context of policy implementation, prior experience and other conditions.

There are many factors affecting the efficiency of the implemented system: deposit fee applied, level of stakeholders' involvement, transparency, fairness to all the parties, level of public awareness, etc. Questioning the efficiency of the system from all the aspects (social costs and benefits, environmental costs and benefits, etc.) is of great importance when ensuring that the system works correctly. Anyway, there could not be pure effect of the system implemented, so DRS is always a compromise between economic and environmental issues, that needs clear balancing of stakeholders' interests, meeting within the system.

Such a balancing seems to have been obtained in Finland, and its DRS, though voluntary by its type, proved efficient. The main features the system bears are the following: it is voluntary for producers and importers, though it is mandatory for the retailers. The system is supplemented by EPR scheme, thus those importers and producers who are not taking part in DRS are still obliged to pay for the packaging under the EPR scheme, and the mix of two policies helps to address two issues: avoid trade barriers associated with mandatory DRS and still collect money

needed for the management of packaging waste. Besides, Finnish system has made it a good practice to re-use bottles, when possible, through the flexible price mechanism applied within DRS: refillables are not followed by additional handling fee paid by importers and producers opposite to those who prefer to use one-way containers. It is also worth underlining that the obligation to reach certain level of collection and recycling is set legislatively, and the responsibility is applied to the administrating organisation. Another important issue is also cooperation between producers and importers of products in refillable bottles that allow them to minimize their costs through clear logistics and responsibilities allocated. The last but definitely not the least point is the traditional strong involvement of citizens in waste management issue.

Lithuanian system is interesting for the following reasons: though the levels of plastic and metal waste collection addressed through the EPR scheme have not been impressive recently, DRS covering glass bottles used to be quite efficient. But since the introduction of DRS for plastic and metal waste in the beginning of 2016, the levels already reached are really impressive, meaning that the decision to launch DRS was a thoughtful one. Citizens of Lithuania have also taken the newly introduced system quite positively, as public poll results show.

## **4 Analysis of Belarusian prevailing conditions**

In order to understand the context of policy introduction, first it seems reasonable to obtain concise data on the geographical location of the country, its population and on the level of socio-economic development. These facts are presented below.

The Republic of Belarus is located in central Europe and borders five countries: Russia, Ukraine, Poland, Lithuania, and Latvia. Belarus became an independent country not so long ago – in 1991. Prior to that Belarus was a part of the USSR.

Belarus is a member of various international organisations; here it is especially important to highlight that Belarus is a member of the Eurasian Economic Union and thus it works under the requirements of Customs Union and Single Economic Space, comprising several countries. On 1 January 2016, the population of Belarus constituted 9.5 million people, with 77.3% urban and 22.7% rural citizens (Belarus official homepage, 2016).

The main natural resources of the republic are wood, peat, potash and rock salts, granite and dolomite, therefore Belarusian economy is characterised as having high import dependency. Foreign trade balance has been negative over two last decades (Belarus official homepage, 2016).

### **4.1 Waste management situation**

Waste management is an administrative system designed “to reduce volumes of waste generated, to prevent its negative impact on the environment and citizens’ health, on the property of state, individuals and legal entities; as well as to maximise extraction of secondary raw materials from waste in order to stimulate material circulating” (the Law of the Republic of Belarus “Waste management” № 271-3, 20 July 2007, with amendments, preamble).

#### ***Legal norms***

The baseline for all legal requirements defining main features of waste management is the Law of the Republic of Belarus “Waste management” № 271-3, 20 July 2007, with amendments. It sets legal basis for waste management activities: storage, collection, disposal, landfilling, etc. It also defines main requirements, roles and responsibilities of entities of various types that function in the area of waste management.

Concerning municipal waste directly, the Law provides definition for it and settles the requirements for municipalities to work out Schemes of municipal waste disposal. It also defines the obligations of household waste producers to dispose of waste at specially designed places and to collect them separately if there are conditions for doing it. Moreover, the Law sets the basis for EPR implementation in Belarus.

The amount of waste generated per year shows gradual increase. In 2013, the total amount of industrial waste was approximately 20 million tonnes, which constitutes almost 20% increase in comparison to the level of 2010. More than half of the waste generated in Belarus is halite waste, coming from production of potassium chloride and sodium, salt, mineral concentrates, nitrogen-phosphorus-potassium fertiliser, etc.

Household waste stream, also showing the tendency to rise in volumes and complexity, was estimated at 3.4 million tonnes in 2013 (Ministry of Natural Resources and Environmental Protection of the Republic of Belarus, 2016).

Household waste represents 66% of the whole municipal waste stream, the rest (34%) is a small part of industrial waste considered to be similar to household and treated the same way as household waste – with the help of municipalities (Ministry of Natural Resources and Environmental Protection of the Republic of Belarus, 2016).

The percentage of industrial waste being recycled is approximately 70% of the whole waste stream, not taking halite waste into consideration. Reusing and recycling rate of household waste is nowadays less than 10%, the rest 90% is landfilled. Moreover, some non-toxic and moderately toxic industrial wastes are disposed of at the same landfills as municipal waste, according to permits issued by responsible authorities – territorial bodies of the Ministry of Environment. (Ministry of Natural Resources and Environment Protection of the Republic of Belarus, 2016)

165 big landfills and approximately 2250 mini-landfills for rural areas are exploited in Belarus. The territory occupied by landfills is 900 hectares; half of that territory is already filled with waste. Many of functioning landfills are rather old, built with violations of modern sanitary requirements. (Ministry of Natural Resources and Environmental Protection of the Republic of Belarus, 2016)

Municipal waste management in accordance with modern international practices and principles in the sphere is nowadays considered the priority sphere in waste management (National Strategy for Sustainable Social-Economic Development of the Republic of Belarus for the period 2020, chapter 4.3). Many attempts have been undertaken to increase the level of secondary raw materials extraction from household waste stream: quite recently, various municipal waste processing facilities have been built, extended producer responsibility has been implemented, several state programmes have been adopted, awareness campaigns have been conducted, etc., but still there is a huge niche for improvements. The responsible authorities work over quite a few tools and instruments to be implemented in order to address the issue, and DRS is one of the most discussed economic instruments at the moment, that may cover easily addressed waste stream – beverage containers packaging, representing considerable part of the whole packaging waste stream.

## 4.2 Municipal waste management paradigm

Municipal waste management in Belarus is an essential part of the whole waste management administrative system. It falls under the same requirements as waste management in general, but carries several specific features.

### ***Legal norms***

Special legislation that sets requirements for municipal waste management. This legislation covers the following issues: list of municipal waste, rules for norming waste generation rate, rules on working out and approval of Schemes of municipal waste disposal, instruction on municipal waste separate collection, technical standards with requirements for municipal waste collection, storage, transportation, sorting, landfilling, equipment needed for the activities, rules for landfill sites, etc.

This branch of legislation is strongly criticised by experts for inconsistency with general legislation terms and requirements, for imperfection of norms, rules and responsibilities, and for its self-incoherence (Gnedov, 2012).

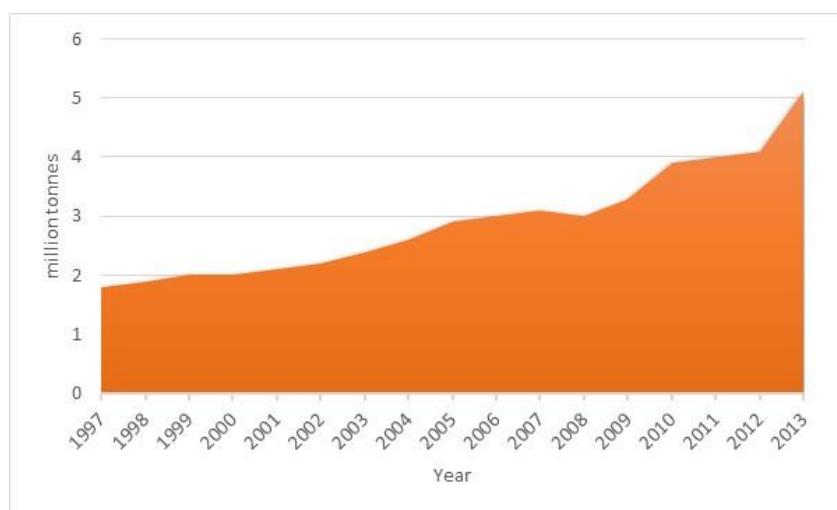
In general, several authorities share obligations within municipal waste management: the Ministry of Environment coordinates work of responsible authorities in the waste management sphere, except secondary raw materials management; the Ministry of Communal Services coordinates and organises management of municipal waste management and, especially, secondary raw materials management, through the responsible organisation, the Operator of Secondary Raw Materials.

Municipal waste consists of two main streams: household waste and industrial waste similar to household. Municipalities are in charge of municipal waste disposal.

The following wastes are classified as municipal according to the List of Communal Waste, adopted by the Regulation of the Ministry of Communal Services and Housing of the Republic of Belarus № 21, 2001.11.30:

- household waste and waste from street cleaning (generated in residential areas, hotels, kindergartens, parks, etc.)
- waste generated by research, educational, sports, cultural and religious activities
- waste generated by trade, welfare and transport activities
- waste generated by administrative activity
- several wastes from health organisations' activities.

The amount of municipal waste generated per year is constantly growing in the Republic of Belarus. The dynamics of waste growth is shown below.



*Figure 3 The dynamics of municipal waste generation in Belarus, 1997-2013.*

*Source: Made by author, based on the data of the Ministry of Environment of Belarus.*

The morphological composition of municipal waste is presented below.

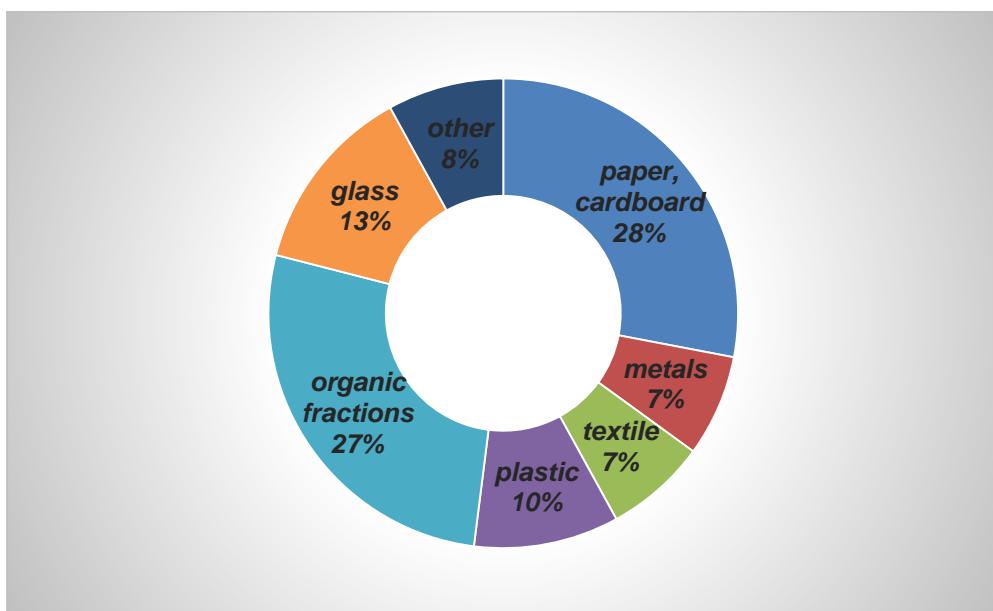


Figure 4 Morphological composition of household waste in Belarus.

Source: Made by author, based on the data of Belnits, 2010.

Though final activity – municipal waste disposal – is the responsibility of municipalities, the requirements on activities conducted before disposal differ when it comes to different waste streams constituting municipal waste: industrial and household waste stream.

Management of municipal waste of industrial origin falls under almost the same requirements as any industrial waste generated in the Republic of Belarus.

#### ***Legal norms***

There is a branch of sub-legal acts setting the requirements for municipal industrial waste producers (cafes, schools, administrating organisations, banks, restaurants, clinics, etc.). These acts regulate waste producer obligations, such as designing instruction for waste management, waste inventory, waste recording, etc.

In reality, it means that this waste stream – municipal waste of industrial origin – is separately collected and disposed of according to waste management priorities: if there is a registered facility in Belarus that can recycle the waste, the waste cannot be landfilled and should be transferred to the recycling facility. Penalties in form of a fee needed to compensate damage to the environment can be applied in case of violation. The rates of the fee are rather high so as to stimulate following the requirements.

Municipal waste from households does not have any special requirements to be applied, except the obligation to collect waste separately if appropriate conditions exist. In fact, the level of separate collection of household waste is very low – approximately 10% (Ministry of Natural Resources and Environmental Protection, 2016). The rest goes to landfills.

Both streams of municipal waste are disposed of according to the Schemes of municipal waste management, worked out by municipalities in coordination with territorial bodies of the Ministry of Environment and institutions engaged in state sanitary inspections.

The majority of Belarusian organisations providing waste collection, transportation and landfilling services are state entities, sub-organisations of the Ministry of Communal Services, as it used to be during the Soviet period time, but there are examples of public-private partnership in the sphere as well. For example, several districts of Minsk are serviced by private companies having the contract for waste collecting and transportation activities. These companies do not have the right to decide upon the rates of fees for citizens, but are free to decide upon fees and services for the companies.

Financial flow within municipal waste management is quite disparate and includes taxes, fees and subsidies.

Different stakeholders and the forms of their financial inputs in municipal waste management system are presented in Table 1.

*Table 1 Stakeholders Financial Inputs in Municipal Waste Management in Belarus.*

Stakeholder	The financial input
Citizens	Pay service fee for waste disposal
Entities whose waste is classified as municipal	Pay waste storage and landfilling tax if the amount of waste generated exceeds 50 tonnes per year and if they are not budget organisations. Also pay service fees for waste transportation
State	Provides subsidies to cover the difference needed to handle waste management facilities, to provide waste disposal service, etc.
The organisations obliged to take part in EPR scheme	Pay fees for the amount of products or packaging covered by EPR scheme
The Operator of Secondary Raw Materials	Uses fees collected from the organisations participating in EPR scheme, for - payments to the companies working over secondary raw materials extraction from municipal waste stream - subsidizing some state programmes in the field.

The fee for organisations, obliged to take part in EPR scheme, is regulated on the state level, as well as waste storage and landfilling tax applied to organisations disposing of municipal waste.

Each municipality decides upon the level of service fee for waste disposal for citizens. There is no difference for Belarusian citizens whether they collect waste separately or not – the disposal fee does not change in accordance to that.

As for waste recycling facilities, the situation is rather difficult for the majority of them due to obsolete equipment, non-stable economic situation in the republic, low quality of materials collected and high competition with foreign companies.

The importance of municipal waste issue is recognized at the state level, and many activities have been undertaken during the last decades in order to change the situation in the field. The main aim of the tools and policies introduced in order to alter the situation is to increase the

level of secondary raw materials extraction. The activities are extensively described in the next chapters and moreover, these activities have become the basis of state programmes that have already been worked out or are being designed.

#### ***Legal norms***

State programmes defining general trends within the municipal waste management field:

- State Programme “Comfortable accommodation and enabling environment” for 2016-2020 period, approved by the Ordinance of the Council of Ministries № 326 from 2016.04.21. It includes subprogramme № 6 “Municipal waste management and use of secondary raw materials”, aiming to introduce tools and instruments designed for reduction of the levels of municipal waste being landfilled, through economic mechanisms aimed to stimulate waste re-use, recycling and recovery. It also sets targets indicators: the rate for municipal waste usage (25% in 2020) and the level of secondary raw materials extraction (0.8 million tonnes in 2020). Measures and finances needed to meet the targets are also defined in the programme. Measures include awareness raising campaigns, building waste sorting, composting and recovery facilities, improvements of municipal waste management systems and the system of secondary raw materials extraction.
- State Programme “Environmental protection and sustainable use of natural resources” for 2016 - 2020 period, approved by the Decision of the board of the Ministry of Natural Resources and Environmental Protection № 8-P from 2011.01.28. The programme sets the following indicators for municipal waste management efficiency: the level of its use should reach 70% in 2025. Unfortunately, nowadays this target seems to be unrealistic, and the target for the year 2015 (at the level of 35%) has not been fulfilled yet and there is no evidence that it will be met soon.
- State Programme “Municipal waste and secondary raw materials management” for the period from 2016 to 2020, now under development (Belarusian Telegraph Agency, 2016). The programme aims to cover 5 main issues: development of logistics and improvement of extraction, transportation, re-use and recycling of secondary raw materials; possibilities for energy-recovery from municipal waste stream; landfill sites enhancement; legislation review and its unification within Eurasian Economic Union; regular information campaigns aiming to promote principles of “green consumption” within population and necessity for sorting waste at source.

### **4.3 Secondary raw materials management**

Much attention is paid to secondary raw materials management in Belarus nowadays. The main tendency for household waste management is to increase the level of secondary raw materials extraction in order to involve it in economic circulation.

Most commonly, different types of secondary raw materials in Belarus are managed within the whole system of secondary raw materials management, though for some streams specific measures have been undertaken in order to address valuable materials. Thus, it seems essential for the purpose of this research to present the situation with secondary raw materials in general, and describe the attempts undertaken to improve it, and then to address and highlight the activities conducted with regards to specific waste streams: metals, plastic and glass packaging. Policies implemented to manage the materials mentioned above are described in the next chapter.

### ***Historical basis of secondary raw materials management***

In some aspects, the system of secondary raw material extraction still bears features of the system used in the USSR period. Three decades ago, in the '80s of the last century, almost all glass bottles (used for dairy products, beverages, including alcohol beverages) and glass jars were refillable and it was an ordinary practice to collect them and to return to specially designed collection points and receive reimbursement for that. The reimbursement came in cash. The level of return was really high at that time, as in many cases the bottle/jar was even more expensive than its content. The deposit constituted approximately 1/1000 of the average monthly salary. At that time, there also functioned the system for collecting paper, cardboard, textile and metal coming from municipal waste stream. It was based on two mechanisms: procuring points and campaigns involving public, for example, competitions in schools. Various ways of stimulating secondary raw materials extraction were used simultaneously. So in the past people used to participate in the system. Since then, various factors have changed the situation: the morphological content of municipal waste altered, the system of public campaigns does not work anymore, the procurement points are not as efficient as they used to be. After the '90s of the last century, when Belarus became an independent state, almost 10 years there was no established system in the field of secondary raw materials collection and involvement in the economic circulation, so Belarusian system may be characterised as rather modern one. The features it bears now began to crystallise just 10-15 years ago.

### ***Current system***

Nowadays the following secondary raw materials could be found in municipal waste stream: paper (28% of the waste stream), glass (13%), metal (7%), plastic (10%), textile (7%) (Belnits, 2010). Moreover, the percentage of plastic waste is constantly rising.

The organisation in charge of secondary raw materials management is Operator of Secondary Raw Materials, established quite recently in order to coordinate activities under the latest EPR scheme, and manage valuable waste materials, except metals.

### ***Legal norms***

Current EPR scheme was introduced in Belarus with the adoption of the Decree of the President of the Republic of Belarus № 313 from 2012.07.11 "About some aspects of household waste management". The major idea of the Decree was to oblige producers and importers of plastic, glass and paper packaging, as well as different household appliances, accumulators and batteries, lubricant oils, lightning and other products according to the specially defined list, pay for the collection, disposal and (or) for the use of waste generated after the loss of consumer properties by goods and packaging.

The Operator of Secondary Raw Materials was established by the Decree, as the coordinating organisation, responsible for secondary raw materials management.

The following 3 ways of secondary raw materials collection are used in Belarus nowadays in order to extract valuable materials from household waste:



1. The system of separate waste collection

It is presented by containers for collecting three fractions (paper, plastic, glass), placed close to the ordinary mixed waste containers. The main reason for collecting three fractions at once is to address associated logistic costs (Argumenty i Fakty, 2013). A system of separate collection

is informally called “the system of yellow bins” due to the colour of containers for raw materials collection. Figure 5 presents the “yellow bin” system.



Figure 5 The system of separate household waste collection, Belarus, 2016.

The system of separate collection (yellow bins) was introduced in 2003 and in that year it covered 300 thousand people (4.3% of urban population). The coverage of the system has been expanding from year to year, and the latest statistical data available shows 66% coverage in 2010, though Report on the Efficiency of Ecological Activities in Belarus written by European Economic Commission of UN in 2016 says “the quantity of the containers used for separate municipal waste collection is insufficient”.

The implementation of the system of separate collection was accompanied by awareness raising campaigns, though results of public opinion poll show the citizens’ attitude toward it was not very positive: the idea to participate in separate waste collection is taken positively (approximately 70% of respondents appreciate it), yet real participation is approved by only 30.1% of the population. The reasons for that are mostly named as the lack of appropriate conditions to take an active part in separate waste collection (Newspaper Zvyazda, 2016). Lack

of conditions is associated with chutes use and with the absence of necessary quantity of so called “yellow bins”.

Though the system of yellow bins is called the system of separate waste collection, it still collects three fractions at once. Moreover, people are not really used to sort waste properly, thus, special waste processing facilities have been launched in Belarus for waste resorting. Since 2004, with three waste processing facilities having the total capacity 0.01 million tonnes/year, the system of resorting facilities had expanded and in 2013 it included 81 facilities with the total capacity more than 0.45 million tonnes/year (Ministry of Natural Resources and Environmental Protection, 2016). Waste resorted on waste processing facilities is sold to recycling companies. The system of separate collection is often criticised for low quality of materials collected through it.

That is the reason why some municipalities or waste management companies design their own system for secondary raw materials extraction, for example, the municipality may choose to have several containers for valuable wastes in public places, instead of using one container for three fractions (see figure 6, demonstrating waste collection point in the park of Baranovichi city. Glass, plastic and paper waste are collected separately from mixed waste).



Figure 6 The system of separate waste collection, park in Baranovichi, Belarus, 2015.

Metal waste is not addressed by the system of separate collection. Metal cans present small market share on the market of beverage containers, though their use is constantly raising, especially for imported beverages like beer and energetic drinks, as nowadays metal packaging is not covered with EPR, thus importers and producers are not obliged to pay the EPR fee. Unfortunately, no statistics is presented to assess the issue, it is an opinion discussed during the interviews.

2. Secondary raw materials procuring centres

Three different organisations are in charge of facilitating these centres. It is the traditional form of secondary raw materials extraction, that collects mostly glass, paper and textile waste. These types of waste are supposed to be most popular due to the rate of reimbursement. As plastic is accepted by weight, and prices for it

are not high, almost no plastic is collected through the procuring centres. These procurement centres may be of stationary or mobile type. There were 1283 procurement centres registered in 2011 in Belarus. With the implementation of new EPR scheme and the requirements for those procuring centres to be registered, nowadays there works approximately 400 entities, including 150 municipal entities (sub-organisations of the Ministry of Communal Services), more than 100 consumer cooperation organisations, and the rest constitutes other forms of organisations taking part in secondary raw materials collection system (individual entrepreneurs, non-subordinated organisations, etc.) (Operator of Secondary Raw Materials, 2016).

Sometimes these procuring centres can be found in grocery shops.

Secondary raw materials collected through procurement centres are either sold or processed by the organisations themselves.

It is worth emphasizing that metals are not covered within this system either, as metals are the priority of a separate organisation – Joint Association Belvtormet that has its own procurement points, accepting metal of different kinds, though it is not specifically addressing municipal waste stream.

### 3. Waste sorting facilities

They are functioning on the territories of landfills. A small part of mixed municipal waste stream goes to specially designed waste facilities to be sorted before landfilling. Sorted out materials are sold to recycling companies. In 2012, the capacity of five waste sorting facilities, including mechanical-biological treatment facility functioning in Brest, was 0.34 million tonnes/year, thus covering only 10% of republic needs, though there are plans to construct a few more waste sorting, as well as several energy recovery facilities. (Argumenty I Fakty, 2013). Four more waste sorting facilities will be put into operation in the near future. In Grodno city the project is financed by the World Bank, other projects are financed with the help of investors, loans and money received through the EPR scheme (Naviny by, 2015; Operator of Secondary Raw Materials, 2016). The idea of introducing these sorting facilities has been always criticised by the experts due to the fact that the purpose of money spent for their construction is not working, as materials obtained through sorting of mixed waste stream are of very low quality. For example, the biggest Belarusian plastic recycling enterprise, RePlas, has to import plastic waste, as due to the poor quality of materials sorted in Belarus, it can't fully load its capacities with Belarusian plastic waste (Belarusian time, 2016). Moreover, the capacity of those waste sorting facilities covers only a small part of mixed municipal waste stream and it does not help to solve the problem comprehensively.

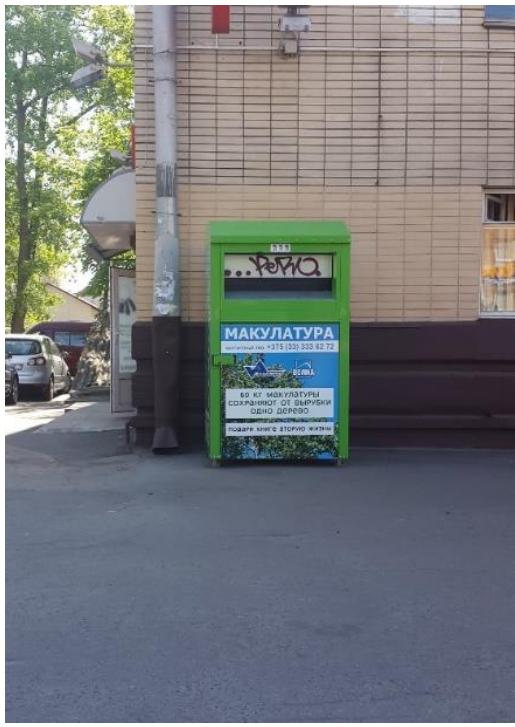


Figure 7 Container for paper waste collection, Belgips-eco project, Minsk, 2015.

With EPR scheme, introduced in 2012, a fourth system of secondary raw materials extraction began to function, the so called “own system of waste collection”, built by organisations obliged to participate in the EPR scheme. They are entitled to choose between two ways of fulfilling the requirements: either to create their own system of waste collection or to join the existing scheme by signing the contract with the Operator of Secondary Raw Materials. As the fee for joining the common system is rather high, some companies do choose to fulfil the requirements by themselves. Belgips-eco project, conducted by two companies in partnership (Belarusian Open Joint Stock Company Belgips and Russian corporation Volma) is an example of such a system. The project started in February 2015, and until nowadays, it has covered Minsk and Minsk region. The project uses its own containers for paper waste collection. Containers are put in the streets, near grocery shops, etc. Until 2016, 480 containers have been installed and started to function (Belgips, 2016). Figure 7 presents the container in the street.

As for industrial waste considered municipal, the producer itself is obliged to take care of secondary raw materials, collect them separately and send them to re-using or recycling facilities.

Nevertheless, the level of secondary raw materials extraction from municipal waste stream remains considerably low in Belarus, as compared to developed countries. Many efforts spent on improvements have led to inexpressive results. The following figure 8 shows the amounts of secondary raw materials extraction over the last decade.

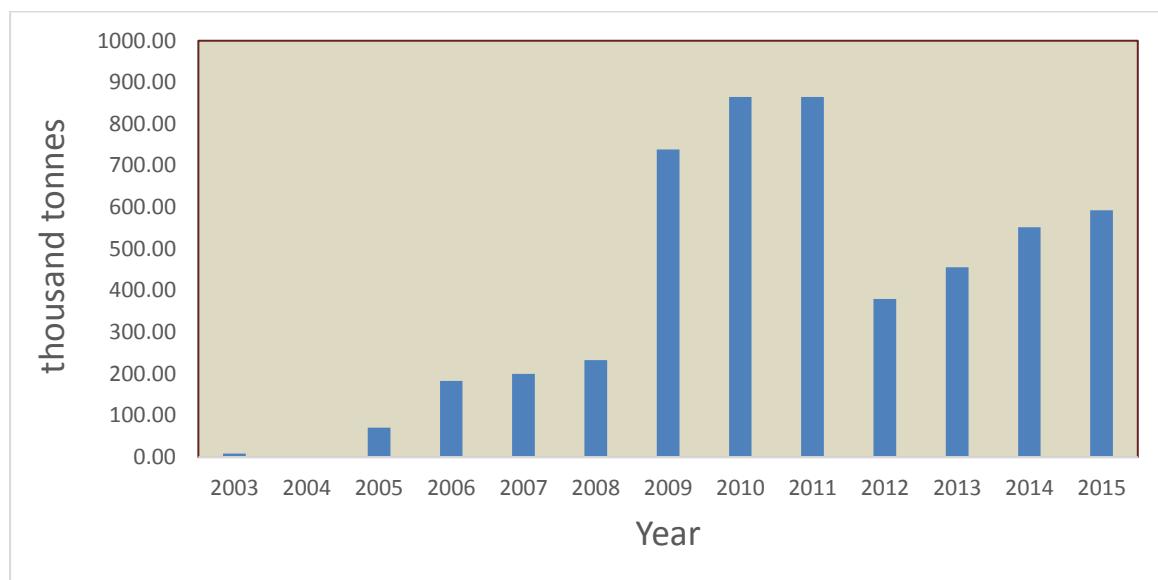


Figure 8 Dynamics of secondary raw materials' extraction in Belarus.

Sources: Ecological bulletins of the Ministry of Environment for the years 2003 - 2013; Reports of the Operator of Secondary Raw Materials for the years 2014-2015.

Please, note: Year 2004 – statistics is not available. 2009-2011 years - there seem to be errors in statistics, as there were no reasons for such a dramatic rise in volumes of secondary raw materials extraction at that time. Unfortunately, the errors in statistics have no official explanations. One of possible explanation could be the frauds in statistics, associated with environmental tax implemented in 2007.

The main waste fractions extracted from municipal waste stream are paper and cardboard, plastic, glass and tires (Operator of Secondary Raw Materials, 2016). Paper and cardboard waste is the most well collected secondary raw material resource in Belarus. Paper waste is used in all paper producing facilities in the republic. Unfortunately, the technologies exploited for paper production in Belarus, do not allow recycling paper waste of bad quality, therefore big amount of paper waste is imported to Belarus. For example, in 2014 only 240 thousand tonnes of the total amount 329.4 thousand tonnes collected were recycled due to the quality of raw materials (Target 99, 2016). Tires are addressed through EPR scheme launched in 2012, and through special collection schemes, introduced in garage cooperatives and service stations. The situation with plastic, glass and metal waste coming within household waste stream, and the attempts to manage them efficiently are described in the next chapter.

#### 4.4 Management of plastic, glass and metal waste

Metal, glass and plastic waste are of special interest to the republic due to several reasons. Firstly, they are either imported as such (as metals) or the raw materials for their production are imported (as for plastic and glass). So when being just landfilled instead of re-used or recycled, they become a waste of money, not only a waste of valuable resources. Secondly, they represent an essential part of household waste stream, and it is a waste of municipal money used for collection, transportation and landfilling, and moreover, it results in the reduction of available landfill volumes. Environmental impact of wastes and of new products manufacturing is also the driving force to address management of these wastes.

### ***Current situation***

Glass waste. Technical Regulations of Customs Union 005/2011 banned re-using of glass packaging, and Belarus raised the question of cancelling this norm. The norm has been changed so that to ban the re-use of glass packaging for baby products only (p.6.2 of the Technical Regulations of Customs Union 005/2011), but still re-using is not a very popular practice in Belarus. The reason for that is mostly associated with marketing strategies, when every producer tries to sell its products in unique bottles to be easily identified among the great variety of producers (see Figure 9 Alivaria beer bottles).

Only several producers of alcohol beverages in Belarus use standard bottles for their products, allowing them to re-use beverage containers. Thus, the most common practice for glass waste is to be reprocessed as cullet.



Figure 9 Alivaria beer bottles, 2015.

It is difficult to divide glass-processing facilities into those working on primary resources and the ones that work on cullet, because they usually combine both. But in general, Belarusian glass processing industry can be characterised by high import dependency: approximately 80% of raw materials are imported (Belarus nowadays, 2016).

It is a very tough time for glass producers right now, though several years ago huge subsidies were provided to them in order to modernise existing facilities. Nevertheless, many of glass factories are bankrupt or on the verge of bankruptcy, like, for example, Glass factory Elizovo, up till the beginning of 2016 famous for being the largest cullet recycling facility, has been announced bankrupt (Naviny, 2016). The main reason for that seems to be the competition with Russian glass production facilities.

According the Operator of Secondary Raw Materials, less than half of mixed cullet collected in Belarus in 2014 was sorted (58.8 thousand tonnes out of 122.9 collected). Approximately 41.5 thousand tonnes of cullet were used in Belarusian facilities, and 30.9 thousand tonnes were exported (Target 99, 2016). Experts blame the system for the fact that a huge part of cullet collected was exported, while at the same time, Belarus imports glass bottles (Belarus nowadays, 2016).

Plastic. There is no practice of re-using primary plastic packaging in Belarus, but quite a good network of recycling facilities is functioning at the time. In 2015 there were more than 100 registered facilities, involved in plastic recycling, though it is impossible to identify how many of them are willing to recycle municipal plastic waste, as it is of lower quality as compared to industrial waste. In 2014, 47.9 thousand tonnes of plastic waste were extracted for further recycling. (Target 99, 2016). Raw materials for plastic production are also imported to the republic.

Metals are a special waste stream, being the responsibility of three organisations, two of those being state entities under the government of the Ministry of Industry (full name – the Ministry of Industry of the Republic of Belarus). The only system of metal waste collection works through special procurement centres. Unfortunately, there is no statistics available on metal

waste coming from municipal waste stream. High percentage of metal containers is used to pack food, not beverages, but the amount of beverages, packaged in metal cans is constantly growing. In practice, people go to these centres only if the amount of metal waste collected is rather essential, as the prices are not so inspiring currently. In reality, household metal waste, including metal cans, goes to mixed waste stream and approximately 90% of that stream is landfilled and only 10% is sorted out with the help of waste reprocessing facilities. It is worth emphasizing again that metals are an imported material for the republic.

***Previously introduced policies aimed to address the wastes:***

Glass and plastic waste. As it has been mentioned previously, during the Soviet period DRS covered the issue of glass waste. No statistics is available nowadays, but the system worked quite well, and it was a common practice to collect bottles and bring them back to special collecting points. The system included almost every type of bottles and jars, except bottles for Champagne, but including bottles used for milk products. Approximately 95% of bottles was collected and re-used during the Soviet time (Newspaper Public Word, 2016).

The system continued to work after the collapse of USSR, though it was not so efficient, and the number of collection points was constantly diminishing. Several reasons may explain it: in the beginning of the '90s, the so-called milk bottle (glass bottle used for milk products) has been gradually replaced by Tetra Pak and plastic packaging. Some processed food packed in glass jars was imported in non-standard jars. Therefore, only alcohol beverages containers remained in the system and that resulted in many collection points closed. The closure of collection points caused inconveniences to customers due to long distances and queues. Moreover, market conditions forced many enterprises to look for unique design of packaging, thus causing reduction of turnover of standard bottles, so there appeared specific collection points that collected only certain types of bottles; most commonly, these collection points were situated close to the producer, so as to reduce associated logistics costs. All that practically led to re-use system disappearance and prevalence of cullet use for production of new bottles instead of re-using the existing ones. In general, approximately 10 years after USSR collapse, there was no big common system managing glass waste in place, so stakeholders chose different marketing and procurement strategies to address the issue, made their own contracts, etc. Gradually DRS functioning through collection points has been substituted by procurement centres working up till now, meaning that each centre is free to decide whether they want to collect certain types of bottles or not, how much they pay for those, whom they sell collected glass. Thus, many people just gave up the habit of collecting glass bottles and returning them back, meaning that vast percentage of glass waste ends on the landfills.

So, the necessity to address environmental issues on a state level served as a driving force to start implementing various policy instruments.

In 2002, a first attempt to implement EPR principle in Belarus was undertaken. Obliged entities were defined as importers of beer and other alcohol beverages, packaged in glass bottles. According to the requirements of EPR scheme, the obliged entities had to pay the fee to a special fund depending on the quantity of imported products. The responsible authority was the Ministry of Trade (full name – the Ministry of Trade of the Republic of Belarus). The money was spent to design the network of collection points for glass bottles (Gnedov, 2013).

A year after, in 2003, the scope of entities obliged to take part in EPR system, was extended and included both importers and producers of products packed either in glass or in paper packaging. The obliged parties were free to choose between two possibilities: either to set their own system of collection or to pay the fee depending on the amounts of packaged products on the market.

Collected money formed a special fund, again managed by the Ministry of Trade (Gnedov, 2013).

It is worth emphasizing that own system of collection should be based on volumes extracted only from household waste stream and that rule still remains unchanged, though EPR scheme has been changed many times up till now, as it is described below.

In 2003 a separate EPR system was launched by the Ministry of Environment for plastic waste. Obligated parties were defined as producers and importers of products packed in plastic. Three alternatives were provided for the obligated entities to fulfil the requirements of the scheme: either to settle own waste collection system, or to pay a fee depending on the amount of their products on the market, or to contract an organization that can provide service for plastic waste collection (Gnedov, 2013).

In the end of 2005, both EPR schemes were terminated due to the changes in legislative norms.

In 2006, a new fee was introduced in regards to glass and paper packaging. Importers and producers of goods in glass and paper packaging had to pay a special fee. The fee was accumulated in a special fund by the Ministry of Trade and was spent for financing separate waste collection scheme, subsidising waste collecting companies and for the development of network of collection points. However, just 6 months after the introduction, the system was displaced by the next form of MBI implemented – the environmental tax (Gnedov, 2013).

In 2006, plastic waste was addressed by the environmental tax. The subject of the tax was the volume of produced and imported plastic packaging. In 2007, the subject was extended and for the next three years, importers and producers of plastic, glass and paper packaging, as well as importers of products packed in plastic, glass and paper packaging were obliged to pay the tax according to the volumes of packaging or volumes of products (in case of imported products packed in plastic, glass and paper packaging), placed on the market. The obligated entities working with plastic waste were free to choose whether to pay the tax or create their own plastic waste collection system (on their own or with the help of specialised organisations) (Gnedov, 2013). The most popular way to fulfil the requirements was to contact specialized organisation, as it was the cheapest option. This practice allowed falsification errors to appear in the system – in reports about volumes collected and in sources addressed for waste collection (the responsible companies reported industrial waste as waste collected from households). Thus, the problem associated with that EPR system – unreliable data, followed by the decision to simplify taxation system in the Republic of Belarus, led to the closure of that EPR scheme.

In 2012, a new EPR scheme was introduced to address plastic, glass, paper and combined packaging, goods according to a specially defined list and imported products packed in plastic, glass, paper and combined packaging. The obligated entities are: national producers of plastic, glass, paper and combined packaging, producers and importers of specially defined goods (such as white, brown goods, lamps, batteries, etc.) and importers of the product, packed in plastic, glass, paper and combined packaging. The obligated entities are free to decide whether they would like to join the existing system of secondary raw materials management or to create their own. Anyway, the obligated organizations have to be registered and provide reports to the Operator of Secondary Raw Material, the responsible organization, about the amounts of product/packaging imported or produced, and the amounts of waste collected through their own system if the organization chooses this alternative. In practice, the majority of the obligated organizations chose to contract the Operator (Operator of Secondary Raw Materials, 2016). The newly established system was based on the system of secondary raw material extraction, that had been functioning prior to

EPR scheme implementation. The core idea of EPR was to stimulate the old system through paying reimbursement to the companies working in municipal waste management sphere for the amount of secondary raw materials extracted from municipal waste stream.

Since the launch of the current EPR, the levels of secondary raw material extraction have increased: total waste collected – by 1.5 times, where the level of plastic waste collection has almost doubled and the level of glass collection has increased by 2.8 times (Operator of Secondary Raw Materials, 2016b). Unfortunately, the results achieved are not impressive if to take into consideration money invested in the system, as the amount of money collected through the EPR system is quite essential. In 2015, the sum collected through the EPR scheme constituted more than 22 million euros (Operator of Secondary Raw Materials, 2016).

One of the possible reasons of not really high results is the absence of any collection rate target set by the responsible authorities. No obligation is put on the Operator of Secondary Raw Materials to achieve certain results, and no responsibility is applied correspondingly. The only figures that can be found as collection rate targets, are set for the entities choosing to fulfil the requirements of EPR scheme through their own collection system and in case of failure to achieve the collection rate, the penalty is applied to the companies. The second issue EPR may be criticised for, is that it is based on prior existed systems of secondary raw materials extraction, that have proved to be inefficient. Experts say that money involved in waste management system by EPR could be used better.

Though one can mention that still there were many activities, undertaken under EPR implementation umbrella, for example, recently, there were introduced systems for collecting special types of waste, such as fluorescent lamps, electric and electronic devices, batteries, etc. Moreover, the Operator of Secondary Raw Materials – the organisation responsible for secondary raw materials management in Belarus – has announced the movement Target 99 which aims to maximise the involvement of Belarusian citizens in secondary raw materials extraction. Target 99 has its own homepage, allowing to learn what can be collected separately for further recycling, where one can find collecting points, what can be produced from recycled materials, etc. Many famous Belarusian people support the movement and the awareness campaign has gained the necessary attention (Target 99, 2016).

It is also worth emphasizing that since 2003 separate waste collection system has been also addressing the issue of plastic and glass waste extraction from municipal waste stream. Waste sorting facilities built in the republic were also separating these types of waste. Procuring centres were addressing the glass waste. Plastic waste is mostly collected through separate collection system; small percentage comes from waste sorting facilities. At the same time, a considerable part of glass is collected through procuring centres, meaning that financial initiative provided for the public serves as the driving force to return waste to specially designed places.

### Metal packaging.

No special policies have been applied to address metal packaging within household waste stream. No separate collection system has been introduced in order to stimulate extraction of metals from the waste stream, neither DRS or EPR scheme has ever been applied to metal packaging producers or products packed in metal packaging, like aluminium and steel cans.

Nevertheless, the system of procurement points under the government of the Ministry of Industry has been functioning since the Soviet time to ensure collection of metal waste of any type – irons, car batteries, etc. The prices were not inspiring enough to stimulate public interest to collect and return metal packaging; thus waste sorting facilities introduced quite recently, just

a decade ago, can be regarded as the only way of addressing the issue of metal packaging in household waste stream.

This situation is rather weird, as metals management is strongly controlled in the republic by different responsible authorities. Most likely, the stringency in legislation addressing metal waste, inability of private companies to enter the market and the responsibility for metal waste management shared between different ministries have led to the situation when metal packaging in household waste stream goes to landfills. And though there is no statistics available on beverages packed in metal packaging and sold on the territory of Belarus, the market share of these products continues increasing.

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Summarizing the information in the chapter, one can say that quite many attempts to address the issue of plastic and glass packaging have been undertaken in Belarus, but up till now they have not led to any considerable changes of situation. The reasons for that mostly lay in the inconsistent approach of the responsible authorities (7 drastic changes of the tools applied within just 10 years' period, as it can be assessed when describing EPR schemes introduction in the republic); in shared responsibilities to address the issue of waste and absence of a common approach to the problem (glass waste was addressed mostly by the Ministry of Trade, plastic – by the Ministry of Environment, and metal – by the Ministry of Industry), and the reliance of the newly introduced scheme on the prior functioning schemes, just improved with some amendments. Moreover, the obliged parties and the subjects addressed by the tools implemented have been reconsidered many times, which made it difficult for organisations to have a settled approach. The absence of good results also means the loss of public credibility to the tools and strategies applied and to the competence of the responsible authorities.

The amount of money involved in municipal waste management should at least cause considerable changes in situation. Unfortunately, nowadays it does not seem to be so. The main reasons for that could be seen in the tendency to use old existing system even for the newly introduced economic instruments. Low public involvement in the system also results in high costs of the system for the state, low quality of materials extracted and high unprofitability of the system.

The responsible authorities realise that the situation needs to be changed, thus there are many ideas on how to address the issue. One of such ideas is implementing DRS for three waste fractions: glass, plastic and metal beverage containers. Though beverage containers do not present 100% of glass, plastic and metal fractions in waste stream, it is still an essential part of municipal waste that could be addressed with the involvement of public. DRS could help to extract valuable materials and collect them separately, obtaining high quality of materials extracted. Moreover, it could eliminate volumes of landfilled waste and reduce associated environmental burden. Additionally, DRS would help to decrease the economic burden of waste management that is carried by municipalities.

## **4.5 Summary of findings**

Nowadays municipal waste management system in Belarus is mostly designed to meet the sanitary aim of waste disposal. Extraction of secondary raw materials from household waste stream for further involvement in economic circulation is not really impressive at the moment if we consider the results achieved. Though many efforts have been put in the field in order to

address the issue and improve the situation, the level of extraction still remains considerably low – approximately 10%.

During the last decades, Belarusian authorities that are in charge of municipal waste management, have introduced several tools in order to improve the situation. Among those one can name economic instruments, designed to address specific product groups and their waste. Thus, EPR schemes of various types, and environmental tax were implemented in order to address valuable wastes, mostly packaging made of glass, plastic and paper. Some technical solutions, such as introduction of separate waste collection system, construction of waste sorting and processing facilities, were introduced to address municipal wastes, including the same types of packaging. Informational instruments, such as various awareness campaigns, have also been presented in order to increase acceptance of the system and to create the initiative for public to take an active part in municipal waste management. Still, though active work has been going on for almost 12 years, the results are not satisfactory at the moment.

The reasons for that could be found in the following:

- absence of clearly defined general state waste policy, that results in unsystematic approach to the challenge
- inconsistency of municipal waste management legislation, its self-incoherence (Gnedov, 2012; Belapan, 2010)
- shared (between different authorities) responsibilities within waste management and, thus, inconsistent approach associated with different focus, responsibilities applied, etc. (Belapan, 2010). Besides, some of the authorities responsible do not have the needed expertise and environmental issues are not their focus and field of interest, for example, the Ministry of Trade, being responsible for systems introduced in order to address waste glass bottles, does not have the needed competence and rights to establish environmental policy (interviews with experts).
- the attempts to solve challenges “at the end-of-pipe”, namely, trying to work with mixed waste stream at the landfills
- costs for participating in EPR were included in the product costs, thus, it was customers who paid for EPR, but not the producers themselves (Mihalap et al., 2012)
- the attempts to increase level of secondary raw materials extraction through stimulating waste management companies, but not the people - real “producers” of waste, per se, and thus, low level of citizens’ involvement
- partly wrong focus of newly introduced EPR– obliged parties are not *manufacturers of packed products, but producers of packaging*, characterised by low ability to influence situation, as they mostly work to fulfil the requirements of their customers – those who produce products
- absence of clear and feasible targets, set legally, for waste collection and recycling and, correspondingly, absence of due responsibility of managing organisation – the Operator of Secondary Raw Materials - for the levels of collection and recycling achieved
- newly introduced MBIs are launched on the previously existing basis, without analysis of their effectiveness and without needed changes conducted correspondingly
- low level of public-private partnership in waste management

- market laws are still working not well in the republic, due to the prevalence of command-and-control ways of addressing the issues. Besides, current monopoly of the Operator of Secondary Raw Materials, preventing market laws to work correctly (EnergoBelarus, 2016)
- mainly, the EPR had only financial responsibility applied (except, sporadically, for plastic waste) and state organisations were in charge of waste collection. The system of waste collection was supposed to be financed from fund, created for EPR scheme, though fund could be distributed for other issues (Mihalap et al., 2012)

All the factors mentioned above have resulted in poor municipal waste management and low level of valuable materials extraction. The problem is recognized at the state level and it has become an essential part of state programmes addressing the environmental issues. Great attention is paid to secondary raw materials management, including the proposal to introduce DRS in the republic.

Plastic, glass and metal beverage containers could become valuable secondary raw materials if extracted from municipal waste stream and recycled. Moreover, the quality of the materials extracted is the important characteristics to be considered. The costs associated with waste management carried by municipalities, will be reduced. Moreover, the problem of littering and the costs of clean-up actions will be also addressed by the DRS. Thus, there seem to be a clear need to implement the approach that could involve public in the system by causing interest in participating in it. Down-stream approach, aiming to stimulate public participation in the system, could address both the issue of the quality and purity of materials collected, and the need of maximising the extraction rate. Besides, DRS had a good public acceptance during the Soviet time, so the implementation of DRS seems to be an interesting option for the republic to address the beverage containers, made of plastic, glass and metal.

## 5 Designing DRS for Belarus

### 5.1 Challenges and opportunities for DRS implementation

In order to make any public policy efficient and to be able to fulfil the objectives set, it is necessary to conduct the analysis of the context of future public policy to identify possible challenges and opportunities.

DRS, as one of market-based instruments of waste management policy, also requires the analysis of context to be designed properly.

One of the forms used to conduct such an analysis is PESTLE analysis, a mnemonic that stands for P – political, E – economic, S – social, T – technological, L – legislative and E – environmental conditions to be identified within the analysis. PESTLE analysis can be applied on different levels and for the purpose of the research it has been supplemented by a classification of the factors divided into three types: opportunities (to serve as the platform for DRS, make its implementation easier), and challenges, subdivided into factors that can be influenced by DRS implementation and those that cannot be addressed by DRS, but would still influence it.

The information below represents the context for DRS implementation in Belarus as identified by the PESTLE analysis framework. Each factor is classified and grouped according to the subdivision described in the previous section. Besides, many factors can be classified as bearing features of several kinds of factors.

#### Political factors:

##### Opportunities

There is a strong political will to increase the levels of secondary raw materials extraction and to improve municipal waste management situation: the state programme “Comfortable accommodation and the enabling environment” for the period 2016 – 2020 contains actions and plans addressing municipal waste management issues; state programme considering DRS as one of the possible ways of dealing with the problem of waste is under development nowadays. Moreover, DRS concept was already worked out in 2015, and preliminary investment plan, the main features it may bear and the plan for its further designing are already under consideration of the Council of Ministers of the Republic of Belarus (interview with Grintsevich).

##### Challenges that cannot be addressed by DRS implementation

Nowadays, municipal waste management in Belarus is characterised by the absence of a clearly set national strategy. Experts criticise waste management legislation for its imperfections and injustices (Gnedov, 2012). Different institutions are in charge of municipal waste management, which creates uncleanness, subordination issues, inconsistency in actions and aims. Besides, Belarusian legislative system is known for the low level of public and business involvement in the process of designing legal acts, and thus it does not usually have efficient ways to communicate and get the feedback on proposals at the policy designing stage.

DRS may meet strong resistance of importing organisations, and it also needs to address the issue of partly open borders, and absence of DRSs in the neighbouring countries (Russia, Ukraine).

Strict sanitary rules should be taken into account when defining the obliged parties, especially collecting points.

Issues that can be addressed by DRS

Several issues can be solved when designing DRS: the low level of public-private partnerships in the municipal waste management sphere, competition that may arise between all the systems of secondary raw materials extraction, functioning in Belarus. As many stakeholders are displeased with systems being changed every second year, there may appear unwillingness of politicians to make sufficient changes in the existing system, thus, resources that are already involved in the existing system should be also considered and used if possible.

## Economic factors:

Opportunities

Many issues may be addressed by DRS implementation: increasing the level of secondary raw material extraction from municipal waste stream, loading recycling capacities with high quality materials, saving municipal money through reduction of costs for municipal waste management itself and also clean-up costs of public places. Materials extracted from waste may become an import substitution for some resources, especially for those that are imported.

Besides, there is already money flow from the implementation of the EPR scheme functioning in the republic that may cover the initial costs of DRS implementation.

Moreover, the practice of reimbursement has worked quite well with the EPR scheme and it may be considered as the readiness of the system to work according to economic laws (interview with Grintsevich).

Challenges that cannot be addressed by DRS implementation

Unstable economic situation in the republic and a high level of inflation could create a barrier for policy implementation, as rather high investments are needed for DRS launching. Experts evaluate the required investment at approximately 50-80 million EUR (Belarus nowadays, 2016). Though, some experts say that *the initial investment costs* will be lower – at the level of 30-40 million EUR (Naviny, 2016). Unfortunately, no details of evaluation are available. There may also

be strong resistance of possible stakeholders to introduce changes to the system, as the level of administrative burden for many of them will increase, producers and importers may be anxious due to the opinion that introduction of the system could affect the demand for the packaged goods due to the price increase.

One should also admit that market-based instruments are not working perfectly in Belarus due to command-and-control patterns in governance. Low prices for secondary raw materials extracted from waste do not stimulate the interest of private companies to address the issue without subsidies received from the state through EPR schemes.

Issues that can be addressed by DRS

DRS may meet anti-lobbying by those who import part of the products illegally, since DRS will oblige them to label containers, and it may serve as an additional way to eliminate illegal import (interview with Grintsevich).

Besides, the current EPR scheme suffers from statistics falsification, thus money and efforts are spent to find out these facts (interview with Gnedov), and partly it can be addressed through DRS implementation, as the origin of waste will be identified more easily, thus eliminating some possibilities for falsification.

Some experts blame the EPR scheme recently implemented in Belarus for two main reasons. Firstly, no targets for the rates of secondary raw materials extraction have been set for the Operator of Secondary Raw Materials, and no due responsibility for its work or for the absence of sufficient results is applied. Secondly, nowadays the Operator has the monopoly in the sphere of receiving and distributing money within the system and this does not stimulate the market to work properly (Republican Confederation of Entrepreneurship, 2016).

Nowadays, low quality of materials collected through the system results in the necessity to import waste in order to load the capacity of existing recycling facilities (Belarusian time, 2016).

## Social factors:

### Opportunities

Current system of waste collection cannot provide equal opportunities for Belarusian citizens; for example, for people living in rural areas, for people living in houses with waste chutes it is difficult to take part in separate waste collection, as these houses are not equipped with containers to separate waste.

Moreover, DRSs are associated with the need to create new working places and jobs for its implementation and functioning.

Most probably, it can initiate cleaner surrounding environment, especially in the woods, on the beaches, etc.

### Challenges that cannot be addressed by DRS implementation

Poor partnership relations between possible DRS stakeholders may negatively influence its efficiency.

Most probably, DRS could meet strong resistance of industry and importers.

### Issues that can be addressed by DRS

Low level of environmental awareness and, thus, low level of citizens' involvement in waste issue could be stimulated through the reimbursement that will be received when taking part in the system.

## Technological factors:

### Opportunities

The existing network of procurement centres may be used as a starting point for the system implementation. Waste processing facilities could be used for logistics within the system.

Materials collected through the system will be of higher quality; thus, Belarusian recycling companies will be able to process them and the need for import waste will be reduced.

A common system could be created to address glass beverage containers and stimulate their re-using.

Challenges that cannot be addressed by DRS implementation

Nowadays, shapes and forms of beverage containers are the way of making products unique and easily recognised by customers.

Issues that can be addressed by DRS

There are no technical standards unifying shapes of beverage containers of any types in Belarus.

Currently, recycling enterprises that could make recycled product with high additional value do not exist in Belarus (Republican Confederation of Entrepreneurship, 2016)

## Legislative factors:

Opportunities

The legislative basis in the form of state programmes addressing the issue of municipal waste management and secondary raw materials extraction is already adopted or is under design. Besides, EPR scheme could serve as the basis for some DRS features, as both market instruments are addressing the common issue.

Challenges that cannot be addressed by DRS

Even brief cross-checking of legislative acts in the sphere shows inconsistencies in the term, definitions and targets of legislation, creating additional burden on municipal waste management system and providing possibilities for different errors in it and misunderstanding between responsible authorities, organisations and public (Gnedov, 2012).

Issues that can be addressed by DRS

Due to the great variety of stakeholders involved, the implementation of DRS would require legislative acts of high level – most probably, the Decree of the President (interview with Grintsevich). The process of designing and approval of high level legislative acts takes rather long time – approximately, 1.5 – 2 years.

## Environmental factors:

Opportunities

Reduction of landfilled waste, reduction of littering and increase of secondary raw materials extraction level are the primary environmental benefits of the system.

Summarising the results of challenges and opportunities for policy implementation, it is important to emphasize that DRS for Belarus will not be designed and implemented on the pure basis: there are many schemes already adopted and working in the republic, that have to be taken into consideration. It seems to be extremely important to consider the efficiency of the working schemes and the need to follow the existing patterns in municipal waste management or change the requirements that do not reach the aim.

Anyway, the analysis conducted help to identify a lot of benefits of future DRS implementation, with the following main being among them: raise of the level of secondary raw materials extraction, prevented (to a certain extend) economic loss and environmental impact, increase of public involvement in the issue, improvement of the measures implemented in order to address packaging waste, valuable waste turn in economic turnover, stimulation of the re-using practices, elimination of frauds within the EPR scheme, etc.

## 5.2 The context for DRS implementation

The analysis of prevailing Belarusian conditions helped to identify the context for DRS implementation, which could be described as follows:

- Legislative and organisational issues. The current EPR legislation could become a starting point for the DRS implementation, as it has already been implemented and started to function. The EPR scheme launched in Belarus in 2012 relies on the existing schemes for waste collection, trying to financially stimulate their effectiveness. The Operator of Secondary Raw Materials – the organisation responsible for the management of waste that represent valuable resources, is in charge of money collected from importers and producers obliged to take part in EPR scheme; so the fund that is necessary to introduce the DRS in Belarus could partly be formed from EPR money.
- Liability issues. There are also some challenges associated with the EPR scheme. Nowadays no one carries the responsibility for fulfilling the obligations to collect a certain amount of waste – neither producers or importers (apart from the obligation to achieve certain levels of waste collection when they choose to create their own waste collection schemes – and that is not the common case, to be highlighted), nor the Operator of Secondary Raw Materials is responsible for that. The obligation of the Operator is to organise and manage the system; the obligation of importers and producers is to pay the fee for the amount of goods or packaging placed on the market (or to create the own waste collection system). Unfortunately, the effectiveness of the system falls under no one's responsibility. Moreover, there are no clear targets for waste collection and recycling rates, set legislatively, which does not stimulate the effectiveness of the system either.
- Competition issue. The EPR has already stimulated attempts of waste companies to address the issue of municipal waste, including packaging waste. Many of them have already invested in the system and increased the number of containers and started awareness campaigns. Thus, the DRS implementation could cause competition between systems, so clearly defined ways to address this competition should be planned in advance.
- Economic issues. Unstable economic situation in the republic is a problem that may affect the system implementation. For example, financial difficulties may result in problems for producers as they will need to label their products, difficulties for retailers to buy and install RVMs if they see it as an option (though, in Finland and in Lithuania some shops use manual return and do not have RVMs installed), difficulties for recyclers to be profitable, etc. At the same time, the DRS may also have a positive economic effect, since this system allows collecting and reprocessing high quality resources.

- Social benefits. The DRS would help to partly address the problem of littering woods and riversides, as this problem still exists in Belarus. Moreover, the implementation of the DRS will cause the necessity to create new workplaces. Besides, costs for waste management will be eliminated partly after the DRS introduction.
- Environmental benefits. Many issues may be addressed by the DRS if implemented properly: stimulating re-use and recycling, saving landfill space, reducing the amount of raw materials necessary for production, etc.

### 5.3 Implementation project for DRS

Communication of European Commission 2009/C 107/01 Beverage Packaging, Deposit Systems and Free Movement of Goods provides basic issues to be addressed when designing or testing DRS in a country. And though Belarus is not a EU-member, the document can still reveal many issues that require special attention while working out the policy. That is the reason for choosing the document as a baseline for future project of the Belarusian DRS.

Several reports on possible schemes for DRS implementation in different countries have served as examples for designing the Belarusian DRS. The following reports were used: A Scottish Deposit-Refund System, written by Eunomia Research & Consulting; Container Deposit Legislation in Ireland; A Proposed Deposit and Refund Scheme prepared by VOICE Ireland; Introducing a DRS for Spain, prepared by Eunomia Research & Consulting.

Below are the recommendations for the Belarusian DRS scheme:

The type. Voluntary for importers and producers of beverages (dairy products are not taken by the system, see the details below in description of possible scope of the system). Retailers, though, should bear the responsibility for collecting empty beverage containers regardless of their assortment. Joining the DRS for importers and producers should be free of charge, though made in such a way as to stimulate them joining. In general, the proposed system could look as follows: nowadays, under the EPR scheme launched in Belarus, importers of beverages packed in plastic, glass, paper, and complex materials containers, and PRODUCERS OF PACKAGING including the same types of packaging are obliged to take part in the EPR by choosing between two alternatives: either paying a fee for the amount of packaging placed on the market or creating their own system of waste collection. If we switch the focus group – PRODUCERS OF PACKAGING to PRODUCERS OF PACKED PRODUCTS – the introduction of the DRS could give an alternative for importers and producers to avoid paying the fee by joining the DRS. Joining the system would be economically reasonable for producers and importers, as the sum of money paid within the DRS would be less than under the EPR scheme, and moreover, deposit would be circulating and paid back to producer or importer when the product is purchased. Such flexibility between two schemes to choose – the DRS or the EPR scheme - would help to address the issue of unique beverage containers and provide the right to choose an economically reasonable decision for the companies on whether to pay the EPR fee and stay unique or join the DRS, or create their own collection system. Besides, it can be the solution to the issue of possible trade barriers that could be a matter of concern for importers, as joining the DRS requires initial investments for participating companies. Probably, some importers would choose to pay the fee under the EPR scheme rather than place special labelling on the products they import.

Moreover, in order to stimulate interest to use refillable bottles, the DRS should also have at least two components: one – for recyclable packaging, another one – for re-usable containers.

The appearance of these two components could be stimulated by slightly different norms applied to refillables and one-way containers: one-way containers will be accompanied only by deposit circulating between customers and producers, followed by annual fee needed for functioning of the system, at the same time one-way containers should be followed by deposit and handling fee, with only the deposit circulating, and handling fee divided between retailers, transporters, re-processors and, partly, recyclers.

One issue that needs attention when introducing the DRS is metal containers which are excluded from the EPR at the moment, so the amendment to the EPR legislation should be done in order to address them within the same norms.

Another issue is the low fee for plastic packaging applied under the EPR that needs to be higher due to high environmental risk associated.

The proposal for the DRS type is based on Finnish system.

*The scope.* The following types of containers could be covered by the system: glass and plastic bottles, and metal (aluminium and steel) cans. Most probably, the scope of the beverages under the system should remain the same as within the EPR scheme, i.e. all the beverages except milk products. Though nowadays the exception from the rules sounds a bit different (producers and importers of socially significant products packed in plastic, glass, paper and combined packaging are excluded from the scope of EPR), in fact it means that only milk products in this context are excluded from the system. Besides, it would be much easier for all the parties involved (customers as well) to clearly set the scope: all beverages, except dairy products, placed on the Belarusian market. Thus products produced for export will not be covered by the system.

There are no reasons to exclude other packaging than that used for milk products from the system's scope. So, for example, bottles and cans for beer and beer-based cocktails are often covered by the DRSs. Moreover, back in the Soviet time, many types of bottles for wine and strong alcohol were refillable, so with a flexible EPR and a DRS as its alternative, producers will themselves choose the issue of preference. Most probably though, importers will not join the re-using scheme since it has a long lever arm and therefore, is an economically insufficient decision, though they may still be willing to join the DRS for one-way containers. For that case the fee taken under the EPR scheme would provide financing for waste management.

The proposal for the DRS scope is based on Finnish system.

*The obliged parties.* In order to ensure the system functioning, the following obliged parties could be suggested: the responsible organisation and retailers.

Currently, a state organisation – the Operator of Secondary Raw Materials, established under the EPR scheme, is responsible for secondary raw resources management. More likely, the responsibility for managing the DRS should be assigned to the Operator with the following suggestion to oblige the Operator reach pre-defined collection and recycling rates within a reasonable timeframe, so as to ensure equality and fairness within the system (as nowadays companies starting their own waste collection system under the EPR scheme are obliged to obtain certain collection levels in order not to have penalties applied), and make the system work correctly.

Some retailers already take part in the EPR scheme and are obliged to organise collection of the waste covered by the system. As for packaging, retailers with the sales area of more than 1,000 square metres are obliged to organise collection of packaging. Thus, it is suggested to oblige retailers with the sales area of more than 300 square meters and all those located in rural areas

to take part in DRS. Rural area is defined as the territory of the republic except 22 defined cities (the Decree of the President of the Republic of Belarus № 6 from 2012.05.07 About Stimulating Entrepreneurs' Activities in Urban and Rural Areas). Catering places should be excluded due to sanitary reasons; gas stations should be excluded due to fire risks. The participation of others should be voluntary. The upper limit for sales areas is settled based on the following factor: Belarusian trade network is characterised by the prevalence of shops with small sales area, thus approximately 80% of grocery shops have areas less than 300 square meters (Belarus today, 2016), though there is a tendency to increase the size of an ordinary Belarusian shop (Concept of Implementation of State Policy of the Republic of Belarus in the Sphere of Internal Trade and Catering for 2011-2015). Such a limitation of retailers obliged to take part in the DRS could help to eliminate the issue of lack of areas available for the storage of empty beverage containers. But nevertheless, every fifth shop will be included, which will provide a rather extensive network for DRS functioning.

The proposal for the DRS obliged parties is based on both Finnish and Lithuanian systems.

*The organisational scheme, including governance.* It is suggested to base the DRS on the currently functioning EPR scheme. Those producers and importers who decide to take part in the DRS, should be registered in a special register. Participation in the DRS should exempt the producer or importer from the EPR requirements partly or fully, depending on whether they choose to cover all their products by the DRS or just a part of them. It is supposed that registration will be free of charge in analogy with the existing EPR register.

Each product should be registered within the DRS, and a registration fee should be applied in order to update the system and follow the information about the new product included in the system, to the collection points and retailers.

It is suggested that each product covered by the DRS would be labelled with two labels: one – an easily recognised sign of the Belarusian DRS, and another one – the unique barcode of container allowing to recognise the producer.

All one-way containers should be placed on the market with the deposit and handling fee applied. All refillables should be followed with only the deposit fee applied. In order to manage the system for refillable bottles, a fixed membership fee should be applied annually.

As for refillable bottles, they could be either collected at so called reprocessing centres or returned to producers with the same transport that delivers products to retailers.

Recyclable bottles should be collected, transported to reprocessing centres, counted, baled if possible and delivered to recyclers. The handling fee should cover costs for collection points, transporters, re-processors, recyclers and the managing organisation.

The proposal for the organisational scheme is based on the interviews.

*Financial flow.* It is suggested that financial flow looks as follows: the deposit and handling fees are collected by the administrating organisation, as well as the fee coming from those who decided to stay under the EPR scheme instead of joining the DRS. Retailers pay the deposit back to producers and importers when customers buy the product covered by the DRS. Customers get the reimbursement when they bring back empty bottles or cans, labelled with a special sign, to collection points or retailers. Containers that are not covered by the DRS are utilised within the municipal separate waste collection system. Collection points and retailers get

the reimbursement and the handling fee from the administrating authority. Transporters, re-processors get the handling fee from the administrating authority, too. The costs of recyclers that are not covered by selling recycled materials are partly covered by the handling fee. The system of separate collection functioning under the EPR aims to collect beverage containers not covered by the DRS, and thus is financed from the money received under the EPR scheme (from producers and importers of beverage containers that will not join the system, and also from other products packaging). Unredeemed deposit could serve to finance system improvements, informational campaigns, to subsidise equipment like RVMs, re-processing centres, etc.

The possible financial flow diagram is presented in Figure 10 below.

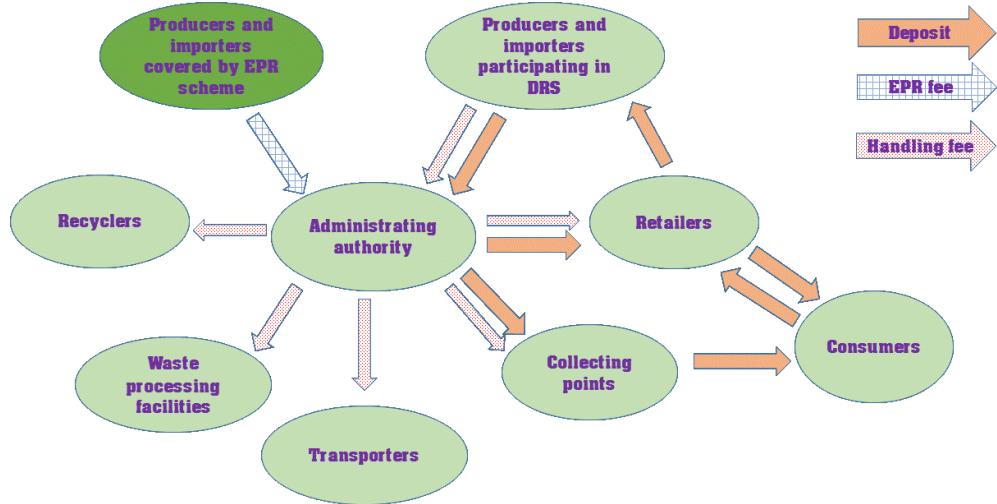


Figure 10 Suggested financial flow within Belarusian DRS.

Source: Made by author.

The proposal for the financial flow is based on the interviews.

Material flow. It is suggested that material flow looks as follows: beverage containers come to retailers from importers or producers. After selling the product, materials come to customers. The customer identifies whether the product is covered by the DRS, and according to that utilises the material by either bringing it back to retailers or collecting points, or by placing it to special containers for separate collection. Beverage containers covered by the system are transported to re-processing facilities for counting, baling (if they come from manual collection points) and further distribution to recyclers (for one-way containers) and manufacturers (for refillables). Manufacturers get refillables according to their market share, though they may negotiate with each other for sharing quotas. Recyclers are free to sell produced materials. The possible material flow diagram is presented in Figure 11 below.

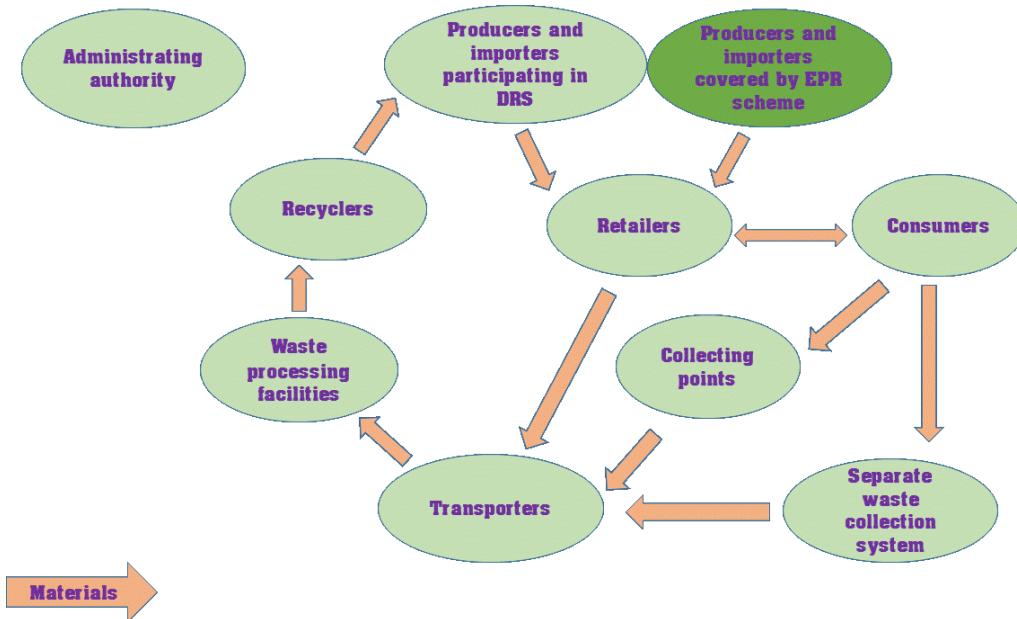


Figure 11 Suggested material flow within Belarusian DRS.

Source: Made by author.

The proposal for the material flow is based on the Finnish system and on the interviews.

The deposit fee, handling fees and their structure. It is suggested that the deposit fee would be the same for all the containers covered by the system, in order to make the administrating process simple. The handling fee applied for the recyclable containers management, should be differentiated depending on the container type.

The rate of the deposit should be more or less comparable with the fee rate paid under the EPR. It means that the deposit could be set at 0.1 BYN (approximately, 5 euro cents), and this rate would correlate with the fee paid for glass bottles nowadays within the EPR, but would be 10 times higher compared to the fee applied to plastic containers. It is suggested to raise the price for plastic packaging due to negative impact of plastic production and utilisation of waste and the need to address plastic with big care.

The proposal for the fees is based on the combination of two DRSs: Finnish and Lithuanian.

Infrastructure. It is suggested that the DRS will partly use the same infrastructure as the EPR nowadays (current procuring points becoming DRS collection points), and will partly start to form its own infrastructure within obliged retailers. Collection could be performed manually or with the help of RVMs. Such form of flexibility could help to lower the costs associated with the DRS introduction, and create convenient for the customers scheme. RVMs could be partly subsidised by the administrating organisation.

Re-processing facilities could work on the basis of already existing waste reprocessing facilities. Recyclers could be those already registered in the Register of recyclers.

The proposal for the infrastructure is based on the interviews.

The targets. It is suggested to start from setting adequate targets for several years starting from the launch of the DRS in the republic. The targets should address both collection and recycling rates. The targets set at the beginning should not be less than those set for the own collection systems within the existing EPR scheme; thus for the year 2017 they should be set at 40% for plastic waste and 60% – for glass waste. The way to make a comparison with the existing DRSSs does not seem to be appropriate, as the context for policy implementation differs, and the rates of different DRSSs also vary within a certain range of effectiveness.

It is also suggested that the levels of collection and recycling of metal cans should be set lower, as currently there is no system of their collection in Belarus, people are not used to separate them, and municipal waste management companies do not have the system for their collection at the moment; so most probably it could take time to introduce a new waste stream that should be addressed carefully.

It is also recommended that targets should be flexible and become higher every year, so as to allow reaching high rates of collection and recycling within a reasonable period of time.

The proposal for the targets is based on the interviews, though Finnish system is taken as a basis.

Ways to address competition of the collecting systems. Two issues must be solved in order to address competition that will arise with the introduction of the DRS: procuring centres functioning nowadays and the system of separate collection of secondary raw materials from municipal waste stream, financed under the EPR scheme.

The following solutions may be suggested: procuring centres will obtain equal conditions with retailers within the system: they will get the deposit back from the operating organisation and a handling fee for their service. It should become a sustainable source of financing for them, as they will cover the lack of collection points, occurring in the result of small retailers being excluded from the range of obliged ones.

The proposal is based on the interviews.

The legislative basis. The amendments to the Decree on EPR are suggested in order to have the whole system set in connection. Sub-legal acts, clarifying the details, should address the issues of targets setting, the issue of logistics, the process of defining handling fees, etc. Moreover, a technical standard for beverage containers that could be processed within the DRS should be worked out.

The proposal is based on the interviews.

The responsibilities. The Ministry of Environment should be responsible for the general control of the system effectiveness and for setting targets. As there is no breweries association in Belarus, that could take – partly or fully – the responsibilities of administrating authority; the Operator of Secondary Raw Materials would, most probably, become the administrating entity, with the responsibilities to fulfil the targets set and to coordinate the EPR scheme supplemented by the DRS.

The proposal is based on the interviews.

## 5.4 Strategy for DRS implementation

It is suggested that the strategy for the DRS implementation has the following main features:

Transitional timing. Some period of time should be stipulated to allow smooth transitioning into a newly introduced system. The time is needed for producers and importers to be able to register, to sell the stock, to label products with the system labels, etc. Retailers obliged to take part in the system also need time in order to define the return procedure, equip storage for empty beverage containers, make the necessary amendments to the documents that define requirements for their activities and also sell the stock. The administrating authority would need time to conduct awareness raising campaigns, to arrange the logistics of the scheme, etc. Waste processing facilities should also get ready to accept materials collected, count and bale them if needed and transfer them further. Thus, three to six months' transitional period is recommended for the system launching.

The proposal is based on the Lithuanian system.

Awareness campaign. It is recommended that awareness campaign started prior to the system launching. Different information sources could be used: newspapers, internet, TV and radio. It would be also useful to address schools and students and prepare materials for them. The campaign could be conducted under the Target 99 campaign umbrella, as the same issue – sorting and recycling waste – is the core idea of both mechanisms – the EPR and the DRS.

The proposal is based on the examples of Lithuanian and Finnish systems.

Financial support of the future system. The initial costs for the DRS implementation are estimated at 600-800 billion BYR (approximately, 30-40 million EUR) (the costs are given in the prices before the denomination that took place in the summer of 2016) (Naviny, 2016). Thus, support of the future system is of vital importance. The EPR scheme can be used as the main source of financial support for the future DRS. Support in the form of grants is also to be provided to retailers – in order to install RVMs when they are needed due to the lack of available territories; to recyclers – in order to align the competition with primary raw materials providers or to modernise the equipment; etc.

The proposal is based on the interviews.

## 6 Conclusions

Circular economy approach aiming to maximise the utility of resources through particular careful use stage followed by the recovery of resources and placing it back in the economic loop, nowadays attracts a lot of attention all over the world. Turning waste into secondary raw material resource and trying to identify the best way how the waste could be prevented, collected, reused and recycled, is one of the components of the circular economy approach. Many environmental policies and tools are designed to address the issue of waste, but different types of waste need different approach to be applied, thus there appeared specifically defined product groups with MBI implemented in order to address the waste of that groups, and DRS is among those instruments. DRS is historically focused on management of beverage containers due to several reasons:

- this type of packaging introduces a special interest as it has short timeframe with consumers, as the process of buying and returning is quick
- beverage containers are substantial and easily visible littering fractions
- beverage containers could be recycled in new products several times without loss of quality
- beverage containers present essential part of municipal waste, and if being landfilled, decomposition time is really long
- beverage containers used for most beverages except dairy products could be processed through collection points without any violations of hygiene requirements, as water can easily wash out the remaining beverage.

Thus, beverage containers are specifically addressed in many countries, and DRS has proven to be the effective tool in managing them. The schemes of DRSs may vary according the context of policy implementation, and it has been shown on the examples of Lithuanian and Finnish DRSs, chosen to be described as the ones that could provide good examples for the Republic of Belarus.

Currently, the results of the measures implemented in order to manage beverage containers in Belarus are not impressive. Though Belarus has been introducing various instruments to address the issue since 2002, up till nowadays the level of extraction of secondary raw materials from household waste stream remains to be low. Unfortunately, no statistics is available on the amounts of packaging placed on the market and so it is impossible to find out the percentage of packaging collected and recycled currently in Belarus, but no doubt it won't be high.

RQ1: What is the current situation with waste plastic, glass and metal beverage containers in the Republic of Belarus?

RQ2: What measures have been used in order to address the management of waste beverage containers in the Republic of Belarus and what was the effectiveness?

Currently, metal beverage containers are not covered by any of the instrument implemented in order to address the waste, except ordinary way of procuring centres that cover all the waste metal. Thus, without any specific focus, metal beverage containers end up to be landfilled, though metal is important material for the republic, as Belarus does not have mineral deposits and has to import metals. Though the share of beverages packed in metal is not very high, it is constantly raising, so the need to address this type of waste is also growing.

Plastic and glass packaging is a specifically addressed waste group in Belarus. Several MBIs, including EPR schemes of various types and environmental tax were introduced since 2002. Several technical solutions were implemented, with separate waste collection system and waste sorting facilities introduced as well. Informational campaigns were also addressing the issue. But nevertheless, the effectiveness of the system is low due to many reasons, with main of those found in inconsistency of approaches and low level of stimulating public involvement into separating waste.

RQ3: Could the implementation of DRS address the effectiveness of the system?

The problem of poor municipal waste management is realised at the state level, and the DRS implementation is one of the proposed economic instruments, aimed to alter the situation with beverage containers. This idea seems to be quite reasonable, as DRS has proved to be effective tool almost worldwide. It creates incentives for public to take active part in separating waste. The quality of the materials collected through DRS is high, thus it could address the issue of Belarusian recycling companies who have to import waste due to the low quality of waste collected in Belarus.

RQ4: How could the DRS be designed in order to be effective, transparent, fair and open within the prevailing Belarusian conditions and the possibility of adapting?

With regards to the examples of DRSs introduced in Finland and Lithuania, the following design of the DRS for Belarus seems to be reasonable: it is suggested that it would be of voluntary type, based on the EPR scheme: so, those producers and importers, who won't join the system, will pay a fee according the existing EPR scheme. It is suggested that it uses partly the existing scheme for waste collection, and partly starts its own through the obliged retailers. The deposit fee is suggested to be the same for all the containers to lower the administrative burden. It is suggested to accompany the deposits for one-way containers with handling fee, so as to stimulate re-using of containers, especially, glass bottles. It is suggested that recyclers would be partly subsidised through the DRS. It is also of vital importance to have the collection and recycling rates set legislatively, so as to apply the obligation to the administrating authority.

The research conducted aimed to fill the informational gap on the system analysis of the measures launched in Belarus since 2002 in order to address specific types of waste, including packaging waste. Though the instruments introduced and shut in a limited time, were not evaluated with the help of ex-post analysis of each instrument, but rather the whole branch of tools was analysed in order to find the answer, whether it has been effective and, if not, what are the reasons for that. The result of analysis will be interesting to the academia and researches when addressing the tools implemented and their effectiveness. It could be used for ex-ante evaluation of MBIs that will be used in municipal waste management in Belarus.

The proposals for the DRS features will be interesting to the responsible authorities, though further research is needed to identify and verify all the details.

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## **Annex I List of interviewees and questions discussed**

1. Interview with Grintsevitch Natalia, the director of the Operator of Secondary Raw Materials.

The interview was done via Internet in June.

The set of questions asked:

- Challenges and issues to be addressed when implementing DRS in Belarus (technological, social, economic, legislative, etc.).
- Opportunities that can be used as a basis for DRS implementation.
- Has business anti-lobbying of future DRS implementation already started?
- Will there be the support of the Ministry of Trade of the Republic of Belarus in the system's implementation? Could the system be opposed by the retailers?
- Is the concept of future DRS defined already? Are any structural elements designed?
- What are the main factors that may influence the effectiveness of the system?

2. Interview with Gnedov Aleksandr, the expert in Belarusian waste management, the consultant of waste management projects.

The interview was done via Internet in July.

The set of questions asked:

- Challenges and issues to be addressed when implementing DRS in Belarus (technological, social, economic, legislative, etc.).
- Opportunities that can be used as a basis for DRS implementation.
- What are the main factors that may influence the effectiveness of the system?
- Which factors should be taken into account when implementing DRS?
- What are the main problems associated with secondary raw materials management in Belarus?
- What are the main problems of waste management legislation in Belarus?

3. Interview with Siarhei Darozhka, the expert in Belarusian waste management, the coordinator and consultant of international waste management projects.

The interview was done via Internet in September.

The set of questions asked is similar to those presented in p.2 of the List.